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The Physiotherapy Review

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Treatment for Cerebral Palsy

Gladys D. Paulitsch

For the purpose of treatment the diagnosis of cerebral palsy must be divided into spasticity, athetosis and tremors and ataxia or primary incoordination. The basic treatment consists of relaxation and muscle reeducation.

In spasticity the injury to the nervous system has occurred in the motor area or cortex of the brain or to some part of the pyramidal tract. It is manifested by the hyperirritability of the muscle or muscles to all stimuli and is a constant condition. It is usually characterized in a neurological examination by hyperactive knee and ankle jerks, positive Babinski sign, occasionally clonus, diminished or absent cremasterics and abdominal reflexes, hyperactive biceps, triceps and periosteoradial reflexes.

To test a muscle for spasticity great reliance is placed upon the stretch reflex. For example, to test the knee flexors, the patient is reclining with the knee supported by a pillow so that the joint is relaxed and flexed; the technician then will passively but rapidly extend the knee. If this extension and consequent stretching of the flexors brings about a resistance and definite contraction of the knee flexors which occurs immediately the motion is started, this group of muscles is considered spastic. The degree of spasticity depends upon the amount of resistance encountered to the passive motion.

A muscle examination frequently reveals that in any one or more extremities there will be normal muscles, spastic muscles and others which the patient is entirely unable to contract voluntarily. These muscles represent a flaccidity which is cerebral in origin in contrast to the flaccidity found in poliomyelitis. It has been found that these muscles will contract with a definite resisted motion somewhere else in the body. For instance, if the tibialis anticus is flaccid, resisted hip flexion on the same side causes a strong contraction in the tibialis anticus almost without fail. This reaction is called a confusion and is used in muscle reeducation.

Muscle reeducation is started fairly early in the course of treatment for spasticity as it is indicated for the flaccid muscles and to improve mobility of the joint at the same time that relaxation is necessary for the spastic groups.

Generally speaking, motion for the spastic at first must necessarily be slow in order to avoid the stretch reflex; otherwise coordinated movement would be blocked and the incorrect motor pattern would be impressed upon the mind of the patient. For the same reason a spastic muscle must never be stretched.

Movements that are extremely slow, even if correct, are impractical in daily life. Therefore, the progressive treatment is to increase speed and amplitude of joint motion through relaxation of the spastic muscles and strengthening of the flaccid groups. All exercises are reciprocal for the joint and alternating for the extremities, and through repetition to definite rhythm correct motor patterns are established.

Athetosis is an extrapyramidal disturbance. The damage is usually to the lenticular nucleus of the basal ganglia. These cases are characterized by the presence of involuntary motions which affect one muscle group after another. Movements may be rapid or slow. Contractions may be maintained or altered slowly giving rise to gross and

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Read as part of the "Round Table on Cerebral Palsy" at the National Convention of the American Physiotherapy Association, New York City, June 1940.

usually varied movements of the extremities and trunk. Such contractions are entirely beyond the control of the individual. In neurological examinations the reflexes should be essentially normal.

Tremors are caused, it is believed, by damage to the globus pallidus in the basal ganglia. They are characterized by involuntary muscle contractions that occur with regularity in contrast to the irregular contractions of athetosis.

Relaxation is the most important part of the treatment of these cases as the chief aim is to eliminate or at least to diminish the involuntary movements. The athetoid has the ability to move all parts of his body but fails to do so because when he initiates a voluntary movement the involuntary movements superimposed upon his voluntary act prevents the satisfactory completion of the desired action. The technic for relaxation used is that set forth by Dr. Edmund Jacobson in his book "Progressive Relaxation." His procedures have to be modified to suit the individual as his principles are applicable to the more or less physically normal adult person and not for the severely physically handicapped child. It is important, however, to teach the child the difference between a contracted muscle and one that is relaxed. This is worked out with a normal group of muscles somewhere in his body and remembrance of the sensation of relaxation is repeatedly brought to his attention until he readily recognizes or is conscious of contractions throughout the body. Gradually he learns to relax the muscles at will and maintain relaxation for longer and longer periods of time.

After the child has learned to relax to a fair degree, motions or exercises are begun first passively then active-assistive and finally active. Through passive movements the child learns further relaxation, as his first reaction is to help or resist the motion. With active-assistive motion and active motion the child must be taught to control overflow movements. By overflow I refer to the involuntary actions which may occur in the upper extremities, face and trunk upon active motion in the lower extremities and vice versa.

Ataxia or primary incoordination is caused by damage within the cerebellum. In these cases there is little or no involuntary motion and no rigidity; but there is the inability of the individual to steer his joint or extremity in the direction intended. The treatment for these cases is muscle training to develop coordination. This problem is approached mainly by utilizing the child's sense of sight through use of mirrors and squares or lines on the floor or table for foot and hand placement. By use of the metronome or any rhythmic device the child is taught a sense of coordinated movements.

Not infrequently the muscles controlling respiration are involved in cerebral palsy cases, resulting in irregular, labored or reversed breathing. Reversed breathing as the term implies means that the diaphragm descends upon expiration and the child tries to speak while inspiring diaphragmatically so that the intercostals have to be violently contracted to force air out of the lungs. Relaxation is most important to correct this condition. Breathing control through regular exercises and correct breathing with voice are most essential.

Massage is used in the treatment of cerebral palsy to increase muscle tonus of the flaccid muscles which are found mainly with spasticity; but the spastic muscles are rarely if ever massaged. In ataxia cases when the muscle tonus is poor, massage also is indicated.

Ultraviolet ray treatment is contraindicated for spasticity as it tends to increase muscle tonus which the spastic already has to a marked degree. Heat in any form is not employed to induce relaxation.

The modalities necessary for treatment of cerebral palsy consist of a table with pad or mattress for relaxation and large joint movements. A polished board and powder are essential for developing smooth, regular and coordinated movements in the extremities. Various sized chairs to fit the individual child are beneficial in teaching differential relaxation in the sitting position and various sized tables to teach hand and finger coordination.

A metronome to establish and keep a definite and regular rhythm for the exercises is most important. For the younger children rhymes are used to create interest and establish smooth, even movements. For older children a definite and regular count may be used.

Mirrors are indispensable for muscle reeducation as the child is doubly impressed if he can see as well as feel his body move in the correct way. They are especially useful for speech and gait work. A ramp with parallel bars is necessary for teaching correct walking and balance.

A stop watch will be most useful in timing the child's balance or control of athetosis. It gives a definite picture of improvement to the technician as well as an added stimulus to the child to attempt to better his own record from day to day.

Toys in the form of balls of various sizes

create interest and develop coordination in arms and hands. Blocks of various sizes and shapes are useful for finger and hand control and tend to keep the child's interest. Modeling clay appeals to the creative instinct of the child. Bubble pipes, straws, a glass of water or balloons are used for breathing control and as exercises. A blackboard and jumbo chalk is helpful in teaching the child to carry over into his classroom the relaxation and control gained during treatment period.

Lacing and button boards are useful to teach the child ultimately to dress himself and to do so with as little effort as possible. The buttons vary in size and shape and the eyelets on the lacing board vary in size so the child can judge his own progress.

The Day School as a Vital Factor in Rehabilitation of the Birth Injured

Elizabeth C. Addoms

The rising tide of concern for the intracranially birth injured child has brought to the surface considerable interest in the special day-school as a fruitful approach to betterment of his physical, mental and social condition. My own work during the past eight years has been with a group of this kind and as a result of our experiment I am entirely willing to recommend such a program as worthy of further use and expansion. It is hoped that the following suggestions may be of assistance to anyone who is contemplating initiation in his community of a day-school unit for mentally normal birth injured children.

Little need be said concerning admission except that there must be a well organized plan of referral and a thorough examination procedure covering medical, neurological, orthopedic and psychological aspects of each case. An efficient follow-up service likewise is essential. Transportation by bus is necessary in most situations.

The school routine, in my opinion, should include academic education, individual daily treatments, group rhythms, lunch and rest periods, occupational therapy, modified team games, art and music appreciation and free play. In addition an hour each week in which the rules and regulations of our most popular sports are taught will prove a source of long-term enjoyment via spectatorship, radio and sport pages.

A psychologically sound award system for physical progress is almost indispensable if the optimum gain in motor ability over a given period of time is to be achieved; and, of course, accurate progress records must be kept—preferably by combined chart and motion picture methods.

Social service is needed for home contacts, financial aid in some instances, summer placement of pupils and vocational guidance if the latter is not otherwise provided. Arrangements also must be made for supply and repair of braces and crutches unless this service is undertaken by hospital clinics.

Periodic parent-staff meetings are of inestimable value in furthering close rapport among all persons vitally concerned with the welfare of each child and in attainment of concerted action for betterment of the condition of each child. Weekly staff conferences for determination of procedure, of course, are an integral part of any efficient departmental routine.

A day-school unit for birth injured children of normal intelligence, if ably organized and competently staffed, should produce results of which any community could be proud. Patience, sympathetic understanding, keen enthusiasm and cooperation of all concerned in such a project are fundamental requisites if every pupil enrolled is to receive the fullest life of which he is capable.

Supervisor of Therapy, Department for Correction of Motor Disabilities, Neurological Institute of New York, New York City.

Read as part of the "Round Table on Cerebral Palsy" at the National Convention of the American Physiotherapy Association, New York City, June 1940.

DISCUSSION

In an attempt to clarify the above, I should like to state that the reason I cannot go more into detail concerning my program is that individual situations play such a very important role. For instance, referral systems that would be efficient in Abilene, Texas, would be very impractical in Minneapolis, perhaps, or in New York City.

In a large city, referral to day-school units for birth injured children might be done through cerebral palsy clinics distributed over the boroughs, if there were several, but this would be impossible and entirely out of the question in a small town. Even the school routine itself to some extent must be influenced by local considerations.

With large numbers of patients to care for, as in a large city, it might be difficult to provide daily individual treatments, whereas in a small city this perhaps could be managed. Also, the amount of academic education offered undoubtedly would vary in different communities, and even in the same community at different times.

A new project might choose to limit the schooling to the first six grades, whereas a better established one might include junior and even senior high school levels.

The reason for suggesting instruction in the rules and regulations of our so-called spectator sports is this: If we are honest we must admit that only a few of our birth injury cases will ever be able to compete with the normal in physical activities, but because they cannot participate is no reason at all why they should not be able thoroughly to enjoy baseball, football, tennis, and so forth, and the first requirement for appreciation of anything is some knowledge of it. Unlimited hours of wholesome entertainment through the years are open to the average crippled child who can enjoy sports vicariously.

The summer placement of pupils has been mentioned. One outstanding need throughout the country is for the establishment of camps to which the birth injured children of poor and lower middle class families can be sent, and where these youngsters may enjoy the benefits of treatment as well as healthful outdoor life. Here is a vast field for charitable organizations, although they alone cannot answer the need.

Concerning psychometric examinations, it must be emphasized that only persons well trained and experienced in giving the tests to spastic, athetoid and ataxic children should be employed for this service, and even then, children rated between 70 and 85 should be admitted for a trial period of at least three months, preferably longer.

In regard to the award system for physical progress, the plan adopted, whatever it may be, should be based on recognition of accomplishment as a sole stimulus to further effort and should not entail any material reward, such as a prize.

It is essential in establishing any school of the type recommended that due consideration be given to preparation of pupils for the future. Vocational guidance to the end that as many as possible of these children eventually will be qualified to make some valuable contributions to society should be of prime concern.

In addition to conferences with parents, parent-staff meetings and home contacts through social service, it has been my experience that granting permission for parents to observe their child's treatment at least once a month is most helpful in that it gives both the parents and the child a fundamental appreciation of their importance to one another in the whole rehabilitation process.

One day a rather tiresome woman brought a child with bow legs to Sir Robert Jones. She was told that the child must come into the hospital for operation. The woman agreed, but said, "Remember, I'll not have my child's bones broken." "Tut, tut," said Robert Jones. "What put that into your head? But you don't mind a little fracturing, do you?" "Certainly not," replied the mother with dignity.—*From "The Life of Sir Robert Jones" by Frederick Watson.*

Speech Correction for Cerebral Palsy

Edna M. Blumenthal

In discussing the technic of speech correction for cerebral palsies it is essential to know the correct diagnosis of the case before speech defects can be eliminated. The success or failure of the entire treatment plan is based upon this fundamental fact.

The underlying principle of procedure in treating athetoids and spastics is entirely different. The athetoid child has difficulty with motion rather than with muscles. He has the underlying ability to move through a definite range of motion, but superimposed on this are innumerable involuntary motions that often thwart or completely block the original motion. The same principle applies to the speech mechanism. If the involuntary motions in the athetoid could be eliminated, his muscles would function normally. To rid the child of the excess motion which hinders him from accomplishing a desired act, he must learn to gain control through relaxation. The athetoid child with speech involvement never knows in which direction the involuntary motion will pull his tongue. It is, therefore, very difficult and often impossible to learn athetoid speech.

The picture presented by the spastic child with speech involvement is entirely different. In a true spastic, careful examination will reveal a stretch reflex in one or more muscles. Spastic muscles are hyperirritable to all stimuli, and testing will show that they will contract as soon as they are stretched. A spastic biceps, for example, will give a clear picture of this reaction. If a child attempts to reach for something held in front of him, the triceps must be contracted to gain the object. At this point, the spastic biceps is put on a stretch, and marked flexion of the arm may be seen instead of extension.

The tongue and lips are controlled by muscles, and it is entirely possible for a spastic child to have stretch reflexes in these muscles as well as in muscles of either the upper or lower extremities. A spastic muscle reacts the same way each time it is stretched; therefore every time a definite word is spoken the same sound will be produced. Because of this, it is fairly easy to learn the distorted speech of the spastic child.

Various methods of speech correction are used with varying degrees of success. The most important point to consider is maximum results in a minimum amount of time. In order to accomplish this in the spastic child, it is essential to keep in mind the possibility of a stretch reflex in one or more muscles of the speech mechanism.

Before teaching vocalized speech, it is essential to correct bad breathing habits due to stretch reflexes or involuntary motions. Correction of breathing is taught in prone, supine and side lying positions. It is also taught in the sitting position. In each case, the child is made as comfortable as possible by the use of pillows. Sandbags occasionally are used for support and to promote a sense of security in the patient. By this method athetosis, stretch reflexes and overflow motions are decreased, and slow rhythmical nonvocalized breathing is gradually accomplished.

As soon as this is fairly consistent, the vocal sound of "uh" or "ah" is used on exhalation. Vocalization often produces the original picture of involuntary motions or stretch reflexes, but control of excess motion can be regained quite easily.

In severe cases of athetosis or spasticity, it often is necessary to start tongue exercises passively. Gauze squares moistened with a mild solution of a pleasant antiseptic are very useful. Active assisted exercises are started as soon as possible and lollypops are used when active motion is started. Increase in amplitude and speed, plus control of overflow, is the goal set for each child. Slow repetitive methods are beneficial to the spastic child because he can learn to work through a stretch reflex. Relaxation and motion from this relaxed position is the basis of training for the athetoid child. Repetitive methods fail in athetosis unless relaxation has been attained.

The larynx controls pitch and quality of sound. When frightened, the voice gets higher and

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Children's Rehabilitation Institute, Baltimore, Maryland.
Read as part of the "Round Table on Cerebral Palsy" at the National Convention of the American Physiotherapy Association, New York City, June 24, 1940.

higher until it is a scream. This is due to tension in the larynx. Through relaxation, tension is released and normal pitch and quality can be produced.

The next step in speech training is control of tongue and lips through vocalization. The vowels "uh," "ee" and "oo" are added to the various consonants controlled by the posterior tongue, tongue tip and lips. These sounds are then reversed. For example, the sounds "kuh," "kee," "koo," uhk," "eek," "ook" are training for posterior tongue. By substituting the letter T for K, the exercise is used for tongue tip training. For lip training, M is substituted for T.

To make speech training interesting, it is essential for the child to learn to repeat words, phrases and sentences as well as sounds. Clarity of speech, plus rhythm and speed, can be developed if fundamental sounds are stressed properly.

Close cooperation with the classroom teacher is of great value. If a child has difficulty with his reading, the teacher can send a list of words to the physical therapist and the child can learn these during his speech lesson. The physical therapist in turn can tell the teacher which sounds are physically difficult for the child and can keep her informed in regard to progress. Through close cooperation the child, because of definite physical limitations, will not be expected to pronounce every word accurately. As the child progresses in the physical control of his speech mechanism, the classroom teacher will and should expect more accuracy in his reading.

Speech correction is often under the jurisdiction of a special speech department. The speech difficulties in cerebral palsies are part of the cerebral palsy and not just a speech defect. Speech training for these cases must be planned in accordance to what is wrong with the rest of the individual. If a child is a spastic, the possibility of stretch reflexes in the muscles of the speech mechanism must be borne in mind. Slow repetition, plus control of overflow motions, is important. Relaxation and motion from this relaxed position is the basis of training for the athetoid. Close cooperation between the speech teacher and the physical therapist can be of inestimable value to the child.

Each department in an institution caring for cerebral palsies has specialists who are highly trained in their own fields. Every member of the staff has valuable contributions to make to the child's progress. In order to accomplish the things we now know are possible with these cases, we must learn to have harmony and a free exchange of ideas among those who care for the cerebral palsy child.

Occupational Therapy in the Treatment of Cerebral Palsies

Elizabeth F. Martin, O.T.R.

Occupational therapy can approach the problem of treatment for cerebral palsies in a number of different ways. With fracture cases, for instance, there are specific crafts or activities which are practically routine treatment for certain types of injury. In cerebral palsy, however, since no two children have identical disabilities, no two treatments can ever be exactly the same. It would not do always to give the same article of work to the spastic that would be given to the athetoid or to the ataxic. The ataxic child might make the same object that a spastic was making, but the technic he was taught to use probably would have to be entirely different. The athetoid child, moreover, might be prescribed the same type of work as the other two, but for an entirely different purpose and with still another technic.

To the true spastic, occupational therapy can

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Read as part of the "Round Table on Cerebral Palsy" at the National Convention of the American Physiotherapy Association, New York City, June 1940.

offer accurate exercise to strengthen specific muscle groups where there is actual weakness. The type of exercise occupational therapy provides often can be used to advantage where it is necessary to teach a child the difference between alternation and reciprocation, and for building up the habit of reciprocation after it has been learned. It can train the child to break up the imitation that goes on from one side of the body to the other, by making him conscious of this peculiarity, and particularly by giving him crafts which will necessitate his making the opposite motion with each hand and arm. It can teach the spastic hemiplegic the consciousness of relaxation of the handicapped side while the normal side is being used with increasing degrees of exertion. Many hemiplegics have a strong tendency to ignore the poor arm and to carry it in a position of extreme flexion. Occupational therapy can point out to these children the advantages of the relaxation they are being taught in physical therapy by means of concrete examples of how that arm can be put to profitable and enjoyable use. With the ataxic child, occupational therapy can train-in eye to hand coordination, and it can do its share in improving muscle tone and coordination. With all types of cerebral palsies, it can broaden the scope of accomplishment and thereby help materially in developing breadth of outlook.

In treatment of the athetoid, occupational therapy can start from one of two extremes. It can take up the child's training as soon as physical therapy has taught motion from the relaxed position in two or more adjacent joints. Or it can start its treatment at the other end of the relaxation scale and work through the tension that is there, making the best possible use of the abilities the child has at the moment. In this case it is working backward toward the ideal state of perfect relaxation, where there is only as much tension in the muscle group as is necessary to accomplish the desired act, and that tension only in the muscles that are required for that act. It is a case of training in lessening tension during actual use.

Perhaps the most interesting is this last phase, where the occupational therapist is helping the child to accomplish the utmost with whatever ability he has at any given moment. Muscle imbalance is liable to show up in a spastic baby almost immediately after birth. Tension in an athetoid may be detected as early as three months. Therefore, it is easy to see that the birth injured child is building up bad habits of motion from the start. Whenever he tries to accomplish a given act, certain of his muscles do not respond normally. This is bound to react on his normal muscles as well as on the pathological groups. Occupational therapy can do a great deal to break up bad habits of the normal muscles while physical therapy is training the involved or abnormal groups to function more nearly normally.

The physical therapist teaches the child to relax perfectly when he makes a conscious effort to relax, and then she teaches him to make correct motions maintaining that relaxation. Gradually he carries over into his daily routine the accuracy of movement he has learned with her. This, however, must of necessity take a long time. The occupational therapist should be the link between the child in the ideal situation during his physical therapy treatment, and his anything-but-ideal situation during the rest of the time.

Correct equipment for cerebral palsy is an absolute necessity. The chairs should fit the child, they should have the correct slant and they should be comfortable. He should have tables and desks that are the proper height and which support his elbows when this is necessary. His feet should be flat on the floor or at least on a footrest and never dangling in the air. The handles of spoons should be big for a better grasp, and tumblers should be small for the same reason. But, when the individual child's needs have been analyzed, and the best possible physical surroundings have been provided, then it is necessary to see that he is taught to use them to his best advantage—not next year when his relaxation has improved, but right away. The sooner he starts the better. If a child has a poor shoulder and a good forearm, it is not necessary to wait until he has learned perfect control of that shoulder before teaching him to feed himself. If he has reached the stage where he can keep his shoulder fairly well relaxed, it may be quite possible to teach him to eat with elbow and forearm motion alone. In this way, when he does learn the control of his shoulder in physical therapy, he already will have learned to use the other muscles which can be combined with the shoulder. And it often is possible to teach a child to type and to dress himself, where the arm motion is still far from satisfactory, by cutting out some of the excess motion which is under his voluntary control and is due merely to bad habits.

If a child is to begin learning useful activities as soon as he starts physical therapy treatment,

it often is necessary to adapt the equipment he uses for his training. Some children may have to start their handwork while lying on a plynth. Others may need to use a relaxation chair. This chair is pivoted so that it can be set at any desired angle, and the slant can be lessened as the child gains better control of his back and neck muscles. Many children can type with less difficulty if they use a table which is cut out so that it fits around their waists, and allows support for the elbows. Others do better with a table of this type which also has a well at one side into which the typewriter fits, thereby lowering the keyboard about two inches. Still others who have a bad tendency toward external rotation of the shoulder may find it useful to have a bar across the typewriter which they can reach and then use as a base from which to strike the keys. Small splints may be necessary in feeding training to block out the motion of the wrist while intensive work is being done on the elbow and shoulder.

It must be emphasized that all of this adapted equipment is a temporary expedient. The more comfortable the child is, the better he can concentrate on control of the muscles that cause his difficulty. One must never lost sight of the fact that the activity is being given as treatment. No matter how well the child performs his task, it should not be considered finished while he can be trained to do it better. With physical therapy working first for relaxation and then from relaxation to perfect motion, and with occupational therapy working toward an improvement in motion *through* the tension that is there, the child should be able to put every bit of his muscle training to actual use almost as soon as he learns it.

The Role of Physical Therapy in Decreasing Time of Disability in Traumatic Cases

Margaret O'Meara, R.P.T.

The average accident case as seen by the physical therapist comes from the rank and file of the wage-earning public to whom prolonged disability means consequent loss of employment or loss of income from employment. The gross expense of such disability is a major problem to the employer as well as to the employee. It entails the temporary substitution or training of another person for the job vacancy, plus the expense of treatment and compensation for the injured. Hence it is to the employer's advantage as well as to that of the wage earner to reduce the time of disability to a minimum. Get the patient as well as possible as soon as possible. Postulating that the patient has had adequate medical and surgical care, and therefore accurate diagnosis, there is no more efficient agent for speedy rehabilitation than physical therapy accurately prescribed and intelligently administered. Everyone knows that a sprained ankle may make a man lame for many weeks, but the period of incapacity depends largely on the mechanical efficiency of the treatment he receives, as well as on the severity of the original lesion. The intelligent application of the prescribed treatment depends (1) on the training and experience of the technician; (2) upon her detailed knowledge of the nature of the specific injury to be treated, and (3) upon the close cooperation between the physician who prescribes the physical treatment and the technician who dispenses the prescription. During the course of treatment, the condition of the injured

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part undergoing repair gradually changes, and hence revision or alteration of original prescription is imperative if the treatment is to be efficacious. Physical therapy "maps out" a planned recuperation by eliminating trial and error methods of treatment. It is a straight course and hence the shortest course to a definite goal.

This discussion shall confine itself to the role of physical therapy in the treatment of sprains, dislocations and fractures, since the majority of the accident cases seen in our clinics can be classified under these chief divisions. The principles of physical treatment for each are relatively identical, inasmuch as these injuries differ mainly in degree of trauma. A sprain is a momentary subluxation in which the articular surfaces of the bones have returned to their normal position and in which there has resulted more or less damage to the ligaments, tendons, muscles, nerves and vessels around the joint. A sprain fracture is a sprain in which a small portion of one of the bones, usually a ligamentous insertion, has been pulled off. A subluxation is an incomplete dislocation in which the normal relationship of the articular surfaces is disturbed but in which they are partly in contact. A dislocation is a complete and persistent displacement of the articular surface of one of the bones entering into the formation of a joint from that of its fellow. It involves a more extensive tearing of the ligaments, muscles and soft tissues than does a sprain and often is accompanied by paralysis and loss of function. A fracture is the breaking of a bone or of a cartilage. When a bone is broken, there is a variable amount of rupture of blood vessels in the vicinity, and a variable amount of damage to the soft tissue, the muscles and connective tissue around the bone. This is due to a tearing of these tissues and to direct traumatism by the ends of the fragments.*

The repair of sprains, dislocations and fractures is physiologically similar. If, in treating dislocations and sprains, the joint is immobilized following reduction, the extravasated blood will be absorbed, and the tear in the capsule will heal by the formation of granulation tissue and a scar as does any other fibrous tissue.

Eventually this scar will be covered by a layer of cells corresponding to those lining the rest of the joint. Torn muscles, ligaments and tendons also tend to heal by scar tissue, but, if the immobilization be continued over too long a period, the ligaments and capsule become shortened, and considerable difficulty may be experienced in restoring joint motion. Extensive stripping of the periosteum not infrequently complicates results by laying down new bone formation during the process of healing which may be so extensive as to interfere with subsequent joint movement. The soft tissue repair about the area of fracture, of course, is identical with that of the aforementioned injuries. It is merely further complicated by repair to the osseous tissue as well. The extravasated blood from the ruptured vessels, both within and around the fractured bone, eventually clots, and the fibrin clot contracts to surround the end of the bone. The hematoma becomes organized then by the ingrowth of young blood vessels and granulation tissue. At the same time, there occurs an invasion of phagocytic cells which act to remove the extravasated red cells and debris. From the sixth to the tenth day after injury the fibrin clot at the ends of the bone fragments begins to metamorphose into a tissue called callus. The characteristics of callus which distinguish it from other forms of granulation tissue are that it contains (1) areas of cartilage, and (2) areas of calcification and ossification. Cartilaginous callus serves to immobilize the fragments to a considerable degree, while in the area of granulation there begins to occur a deposition of lime salts in the matrix of the primitive callus. Imprisoned masses of calcium salts gradually are replaced by bone through the activity of the osteoblasts. This new bone, however, is irregular and cancellous or spongy in structure. Simultaneously with the development of this primary osseous tissue, ultimate new bone begins to form beneath the stripped-up periosteum around the fragments. Slowly the periosteal bone cells grow down toward the area of fracture to invade and replace the callus. At the same time as the invasion of callus is being made by the ultimate bone which is to heal the fracture, there is a tendency to resorption of excess callus around the site of the break. Eventually in the course of several weeks the new spongy bone, meeting and fusing across the fracture line, becomes transformed into dense cortical bone, which in time assumes its normal contour and thickness, although for several years after the accident the site of fracture is marked by a zone in which the cortex is thicker and the cortical bone more dense than normal.

On the basis, then, that the three major injuries differ only in degree or extent of trauma incurred at the time of accident, and that their processes of repair are physiologically similar, it may be further assumed that their course of treatment will follow the same general lines, varying chiefly

according to the indications of the individual case and the degree of severity of the original lesion.

It should be understood from the beginning in choosing therapeutic agents that massage is merely one of several means of restoring function of an injured part. It will not increase the range of motion of the joint. It will not improve muscle power. When applied to a limb that has sustained very recent trauma, massage is chiefly a preparation for later mobilization. It aids materially in reducing to a minimum the time of immobilization. By being administered as immediate treatment, massage, or more specifically, superficial effleurage proximal to the area of injury hastens the removal of effusion by reflex stimulation before the process of organization is under way. When soft tissues are traumatized the fascial planes are distended almost immediately with extravasated blood. Cob-webby adhesions form rapidly. The affected tissues, because of the impaired circulation, tend to necrose, and the quickly organized hematoma becomes an excellent culture medium for bacteria. Physical therapy should be started early while the effusion is still gelatinous or plastic before the soft tissue layers begin to be bound down by fibrosis.

Following gentle effleurage, immediate splinting to limit trauma is the most adequate way of relieving muscle spasm in the injured area. Spasm is an attempt on the part of nature to splint an injured part, or in the case of fracture, to check the further displacement of the fragments by the reflex protective contraction of the muscles around the joint. Unless these muscles are relaxed the contracted muscle compresses the lumen of the vessels. This impairs the venous and lymphatic circulation and produces a marked edema.

Thermotherapy as an immediate treatment for recent injury is strictly to be avoided. It is agreed that heat is the most potent physical agent for the relief of muscle spasm because it acts to dilate the capillary network of the skin and to decongest the deeper tissues by opening new channels for the absorption of exudates. But this vasodilating effect certainly is not to be desired in areas where hemorrhage has occurred as a result of vessel rupture. The injured extremity should be kept at rest in splints or strapping until the torn ends of the vessels become sealed off and further hemorrhage prevented. During the days following injury, massage of the part should gradually increase in pressure. Deep effleurage and gentle kneading above and below the joint involved are of great assistance in maintaining the nutrition and circulation of the part, particularly if the severity of trauma demands fixation. Any agent which improves nutrition promotes repair. As soon as the period in which the possibility of additional hemorrhage is safely passed, heat in any of its various forms may be applied—not in the sense of the traditional hours of baking but merely as a preparation for massage. Dosage must be definite and accurate. This is particularly true in the use of short wave diathermy, for experience has proven that an overdose of deep heat causes a temporary paralysis of the vasomotor system, resulting in an undesirable passive hyperemia and may in some cases explain the apparent carrying off of necessary calcium salts from the site of fracture repair. Heat is merely a useful adjunct to massage, and massage in turn is merely preparation for active exercise. The joints above and below the site of injury should be put through their full arc of active motion as soon as possible after injury; at first, just once or twice daily, later increasing the frequency until the patient is exercising not less than every hour. Passive motion has no place in physical therapy treatment of the average traumatic case, for it is likely to cause unnecessary damage to the traumatized tissues and increased reaction and effusion with corresponding increase in pain.

Active assistive and later resistive motion should be used. Active motion is the natural physiological function of the muscles and joints and hence is the best physiological stimulus to their proper nutrition and normal use. Active motion alone increases muscle power. It alone develops and increases a constant good range of joint motion without producing pain. Its dosage is regulated by the tolerance of the patient. If the performance of any exercise causes exaggeration of the symptoms, the method and dosage should be modified.

Perhaps one of the most efficacious and most simple accessible remedies used for the convalescent traumatic case is the hot and cold bath. In our experience, the spraying of the part with alternate hot and cold water is a more satisfactory method than the contrast plunge using two buckets of water. For the pressure of the water forcefully impinging against the skin exerts a mechanical effect on the surface capillaries not otherwise possible. A full minute spray with hot water followed by a single whip of cold and repeated not less than ten times produces a rapid filling and emptying of the small vessels. Re-

flexly it improves the tone of the vessel walls. It relieves pain by facilitating change of circulation, reducing undesirable congestion and improving the physiological efficiency of the traumatized tissues. The traditional home remedy of soaking the injured part in hot water never should be allowed, since this only causes the involved areas to remain more tender and pools the blood in a part already turgid with effusion, thus increasing the bogginess of the tissues and the sluggishness of physiological functions.

After initial healing of the soft tissues has occurred, it often is desirable to supplement assisted active motion by use of the low frequency electrical current in order to bring into play those muscle fibers not yet voluntarily controlled by the patient. Where, after injury, repair has been accomplished only by the formation of a considerable mass of cicatricial tissue, the low frequency current, when gently administered, is useful in preventing undue contracture of the fibrous tissue and in keeping the scar pliable as well as increasing the volume and strength of the muscular response. As the muscle power and joint range gradually improve in the injured extremity, the importance of treating by heat and massage becomes secondary to active joint movement. During this stage of treatment the patient depends upon the physical therapist mainly to supervise and outline therapeutic muscle-training programs which must be carried out as a daily routine at home. Exercises performed once or twice daily are of negligible value. It is imperative that they be done not less often than every hour if the total time of disability is to be shortened. The program of graduated specific muscle reeducation must be gradually increased in proportion to the improvement in power of the traumatized muscles until finally normal function is achieved and proper habits in functional balance attained.

The convalescence of the traumatic case not treated by proper physical therapy presents a very different picture. Sometimes to insure good boney union of a fractured part, or complete ligamentous repair in cases of dislocation or severe strain, the part is kept at rest so long that the stiffness of the involved or neighboring joints almost simulates an ankylosis. This stiffness usually is mechanical in origin being due to the development of tough fibrous adhesions in the capsule itself or in the soft tissues around the joint or by blocking of the range of motion by fragments of bone or deposits of callus. If, on the contrary, the sprain or subluxation has not had sufficient splinting and rest, the scar in the ligaments and tendons which normally brace the joint become permanently stretched and the resulting instability of the joint leaves it predisposed to further trauma or chronic disability. Nonunion or malunion of the fragments is not an uncommon complication of the fracture which is not kept at rest long enough for healing to be completed. If injudicious movements are allowed before the callus is firm enough to withstand them, an excessive amount of callus often forms between fragments due to the unnecessary irritation of the exudate by imperfect fixation. But always there is present in these cases not the usual fibrositis found in any traumatized part but instead a marked chronic thickening of the entire involved extremity. Adding to the congestion about the joint hematomata often organize and not infrequently occur in the sheaths of the nerves and vessels or even in the belly of the muscles, matting them together or binding them to underlying tissues. Time rapidly toughens these fibrous bands often to the stage where they never will be stretched out conservatively. Impaired circulation causes chronic edema and the dusky appearance of the extremity with associated pain is indicative of venous congestion. Unadvised, the patient often soaks the part in hot water for relief, or uses a heating pad for hours at a time with the result that the tenderness and congestion are increased rather than decreased. Joint function is seldom restored by trial and error exercise. The patient unmindful of the anatomy of the part or of the pathology of the lesion does not recognize the indications or contraindications in using muscle training, and hence derives but fragmentary value from his efforts. Time drags along. Prolonged disability causes the patient to become skeptical of the obviously poor results of his own efforts. Often, worried by loss of employment, he turns to the unlicensed charlatan for relief, unless qualified professional guidance is available.

In conclusion, it should be axiomatic for the physical therapist treating accident cases to regard every detail as essential, for in this one precaution lies the secret of success or failure of treatment. Accurately prescribed and efficiently administered, physical therapy is the greatest single aid for reducing the time of disability in the traumatic case, at the same time achieving the best functional result.

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The Physiological Pathology of Peripheral Vascular Disease

Irving S. Wright, M. D.

It is particularly important that the members of the American Physiotherapy Association should have a considerable knowledge of the fundamental physiological and pathological phenomena of the circulatory system. The normal structure may be divided into the vessels included in the major circulation of the blood, which may be listed in order of the passage of the blood through them—as heart, aorta, arteries, arterioles, glomi, capillaries, venules, veins, venae cavae and heart; and the minor circulation which includes the pulmonary arteries, arterioles, capillaries, venules and veins. In addition there is the circulation of the lymphatic system which includes the rather loosely knit tissue spaces, lymphatic channels, lymph nodes and major lymphatic ducts. Pathologically it should be clearly pointed out that vascular diseases may, and frequently do, affect vessels of any portion of the body. It should be emphasized that our interest must be broader than the involvement of the circulation of the extremities. It becomes important, therefore, to consider seriously the prognostic significance of a lesion which may be developed in one portion of the body as it pertains to the vascular system in other organs.

The pathology of vascular diseases cannot be regarded as simple since considerably more than fifty different specific disease entities are included under this heading. Just as the pathology is widespread, so the symptoms are equally varied in their manifestations since they depend upon the tissues which become ischemic or plethoric as a result of occlusion or overdilatation of the vessels supplying them. Below you will find a list of conditions (which is incomplete) that will serve to indicate the breadth of our problem.

Diseases of the Arteries

1. Arteriosclerosis - senescent - lead - diabetic - hypertensive
2. Thrombo-angiitis obliterans
3. Arterial embolism and thrombosis
4. Arterial-venous anastomoses
   a) Congenital
   b) Acquired (mostly traumatic)
5. Cervical rib-scalenus anticus syndrome
6. Essential periarteritis (periarteritis nodosa)
7. Temporal arteritis and essential thrombophilia
8. Rheumatic arteritis
9. Tuberculosis of the arteries
10. Syphilitic arteritis
11. Single and multiple aneurysms of undetermined etiology
    a) Mycotic aneurysms
12. Frost bite
13. Coarctation of the aorta and other arterial anomalies

Diseases Due to Combined Involvement of the Nervous System and the Arterial Blood Vessels

1. Raynaud's syndrome - scleroderma
2. Traumatic vaso-spastic disease (pneumatic hammer disease)
3. Acrocyanosis
4. Erythermalgia (erythromelalgia)
5. Spasm of the arteries associated with nerve injury
6. Glomus tumors

Diseases Due to Combined Involvement Blood Forming Organs and the Arterial Blood Vessels

1. Polycythemia vera with gangrene
2. Leukemia with gangrene (several types)
3. Pernicious anemia with gangrene
4. Hemoglobinemia

Diseases of the Venous System

1. Thrombophlebitis
   a) Local
   b) Migratory
   c) Post-phlebitic varicose veins
   d) Post-phlebitic ulcers
2. Varicose veins
   a) Congenital (idiopathic)
   b) Acquired-secondary to pressure
3. Phlebosclerosis
4. Anomalies of the veins
5. Venous thrombosis
6. Tuberculosis of the veins
7. Syphilis of the veins

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8. Chemical phlebitis
   a) Arsphenamine
   b) Glucose

DISEASES OF THE MINUTE VESSELS
ARTERIOLES - VENULES - CAPILLARIES

1. Increased capillary fragility (or hyperpermeability) due to
   a) Infection (scarlet fever - pneumonia, etc.)
   b) Poisons (arsenic, phosphorus, phthalein, venom, etc.)
   c) Vitamin C deficiency (scurvy)
   d) Menstrual cycle
   e) Idiopathic (thrombocytopenic purpura hemorrhagica, Henoch's and Schoenlein's purpura)

TUMORS OF THE BLOOD AND LYMPH VESSELS

1. Hemangioma
2. Hypertrophic granulation tissue
3. Hemangioma simplex - vascular nevus (telangiectasis)
   a) Nevus vinosus
   b) Plexiform angioma
   c) Angioma of muscles
   d) Hemangioma hypertrophium
4. Cavernous angioma
5. Angioma arteriole racemosum
6. Endothelioma
7. Hemangio-endothelioma
8. Perithelioma
9. Glomus tumor
10. Lymphangioma
11. Lymphangio-endothelioma

CLINICAL CLASSIFICATION OF LYMPHEDEMA
AFTER ALLEN AND GHORMLEY

A. Non-inflammatory
   1. Primary
      A. Precox
      B. Congenital
         1. Simple
         2. Familial (Milroy's disease)
   2. Secondary
      A. Malignant occlusion
      B. Surgical removal of lymph node
      C. Pressure
      D. Radiation therapy
B. Inflammatory
   1. Primary
   2. Secondary
      A. Venous stasis
      B. Trichophytosis
      C. Systemic disease
      D. Local tissue injury
      E. Filariasis

It would be practically impossible, in a presentation of this type, to discuss the pathology of even a considerable proportion of these many diseases. Therefore, certain conditions have been selected as examples of various types of vascular disease. The most important of all vascular problems—pathologically, medically, socially and economically—is arteriosclerosis obliterans. There has been a steady increase in the proportion of the aged in this country. At present in this country there are approximately 25 million people over 50 years of age. Of this group 60 per cent, or 15 million, will die of cardiovascular disease, of which over 70 per cent will be due to lesions of the blood vessels involving the brain, kidneys, heart and mesenteric vessels or vessels of the extremities. (By way of contrast, approximately 9 per cent of this aging group will die of cancer.) We are in no way prepared to handle this problem which is rapidly increasing, since it is computed by reliable authorities that by 1980 the number of aged will be approximately double its present proportion. Arteriosclerosis may involve any arteries or veins of the entire circulatory system. It tends to localize at points of stress on the vessels, such as places where the vessels bend and places where the vessels are attached to bone structures. We do not know the cause of arteriosclerosis and must admit frankly that despite the various theories of the importance of diet, nutrition, worry, overwork, trauma, climate and other aspects, we have no established evidence that any of these factors is responsible for the production of the condition per se. We do not even know whether it should be classified as a disease or a degenerative process. We do know that lipoid deposits occur in the intima of blood vessels with cholesterol crystals frequently being present and that eventual development of calcium plaes occur. Winternitz and his co-workers have shown that minute hemorrhages of the vasa vasorum (small blood vessels supplying the walls of the blood vessels) ultimately may produce changes of this type. But his conclusions have been challenged by some workers and we are not positive as to how great a factor this type of mechanism is in the production of arteriosclerosis in the human race as a whole.

The sclerosis or calcification may occur in isolated plaes scattered along the course of the blood vessels or it may be fairly uniformly distributed throughout their course. The major calcification may occur involving the intima and obliterating, by means of an overgrowth of the intima and thrombosis, the lumen of the vessels,

or it may occur primarily in the media producing tubular hardening of the vessel but not resulting in obstruction of the type just described.

X-rays are of considerable value in determining the presence or absence of arteriosclerosis. Flat plates of the soft tissues frequently will show the presence of the calcification. This type of x-ray, however, does not determine whether the vessel is occluded or not, and for that purpose arteriographic studies using the contrast medium, Thorotrast, are helpful since they show both the point at which the occlusion occurs in the major vessel and the amount of collateral circulation available and active. These studies are not always necessary since, by means of palpation and the proper use of the oscillometer, an estimation regarding the patency of the major vessels can be made. Arteriographic studies are, however, the best method of studying the collateral circulation. The clinical manifestations of arteriosclerosis obliterans depend entirely upon the site of the obstruction. As one might expect, the vessels supplying the kidneys would produce nephritic symptoms, those supplying the brain would produce neurological symptoms, those supplying the lungs would produce pulmonary symptoms, those supplying the extremities would produce ischemia of the muscles and superficial tissues of the legs and feet. For example, intermittent claudication arises as a result of ischemia of the muscles involved. If this process progresses in these vessels or any vessels supplying the more superficial tissues, we have the development of tissue death with either small ulcers or large ulcers with gangrene.

Another condition to be discussed is thromboangiitis obliterans. This disease, which is almost entirely limited to the male sex, is one which might be called a "young man's disease" whereas arteriosclerosis is known in general as an older person's disease. Here we have a definitely inflammatory type of pathological lesion with an overgrowth of the intima with inflammatory cellular lesions, and which occurs involving the veins as well as the arteries. In fact, frequently the first manifestations are those of repeated attacks of what often appear to be thrombophlebitis of the usual type. The nerves are also sometimes involved as a result of direct extension from the inflamed veins or arteries which the individual nerve accompanies. Any set of blood vessels in the body may be involved although frequently this is not fully appreciated. A certain percentage of these patients develop coronary thrombosis on the basis of the thromboangiitis obliterans. We have seen the ravages of this condition as it affects the mesenteric and cerebral arteries and other vessels. The clinical evidences are not dissimilar from those seen in arteriosclerosis, except that the condition appears to be more inflammatory with the development of ulcers, inflammation and gangrene. In some instances intermittent claudication is the only symptom, but if this continues and the patient is not properly treated, the ultimate result is almost surely to be seen as ulcers or gangrene. The ulcers are excruciatingly painful. It should be mentioned that the smoking of tobacco is an important factor in the progression of this disease, and that so long as this is continued, therapy usually is of no avail.

The next condition to be considered is known as the Raynaud syndrome. This might be characterized as being a disease with the following primary requirements for diagnosis: (1) The development of intermittent attacks of changes of color on various local areas produced by cold or emotional stress. (2) Symmetrical or bilateral involvement most frequently including the hands, feet or both. (3) The absence of evidence of occlusive lesions of the arteries until late in the disease. (4) Gangrene or trophic changes limited in a large degree to the skin. The exact pathology of this disease is not known, although it is suspected that changes probably take place in the automatic or sympathetic nervous system. The characteristic syndrome might be described as follows: When the patient is exposed to cold or becomes emotionally upset the hands, feet or ears become cyanotic or blanched. There is a feeling of numbness, and tingling sensations arise in these areas. This situation continues until the patient is returned to a warm environment or the emotional crises passes, at which time the redness begins to suffuse into the blanched or cyanotic area. This is due to the fact that the small arteriols which have been in spasm due to overstimulation of the sympathetic nervous system are opening up, allowing the red oxygenated blood to pour into these areas and replace the deoxygenated blood. The small vessels relax and expand, then overdilate and a phase of erythema takes place. This continues for about 20 minutes with a final return to normal. Such episodes may occur many times a day. Eventually the small arteriols begin to show changes with occlusive tendencies and small ulcers or gangrene may result from such occlusions. Scleroderma (hardening of the skin) is a frequent complication of this condition. It results from an overgrowth of the callogenous fibers in the subcutaneous tissues and this fibro-

sis may extend into the muscles and attach the skin firmly to the bone. It is frequently a disfiguring and incapacitating complication, and whereas autonomic nervous system surgery may offer help to patients with a Raynaud's syndrome, the presence of scleroderma prevents this from being successful since there is then introduced a local fault which prevents the blood vessels from opening widely even after the sympathetic fibers have been cut.

The fourth condition of interest is known as arterio-venous anastomoses (arterio-venous fistula). This sometimes is erroneously called arterio-venous aneurysm. Briefly this condition may be defined as a short-cut in the wall of the blood vessels which directly connects the artery and the vein thus preventing the necessity of the blood having to go through the capillaries. It may be either on a congenital or acquired basis. Many instances are produced by penetrating or crushing wounds which establish a channel between the artery and vein. This channel becomes lined with endothelium and does not close. The local pathology includes a marked dilatation of the veins of the area since they are at times subjected to the arterial pressure which is far higher than their walls are built to withstand. The temperature of the area becomes higher, a bruit can easily be heard, samples of the venous blood show a much higher oxygen content than that of the opposite side of the body and if it is in an extremity, the extremity increases in size as compared with the opposite one. This occurs even after normal mature growth has been reached. This condition results in an imbalance of the normal circulatory pressure, the result being that the heart works harder to maintain the circulation. If the anastomosis persists, the result is ultimately seen in hypertrophy and failure of the heart. It is important, therefore, that these anastomoses when diagnosed should be surgically obliterated whenever possible. Sometimes they are multiple and the surgery is rather difficult.

A disease which frequently is undiagnosed until the patient is on the postmortem table is that of essential periarteritis, formerly known as periarteritis nodosa. It should not be called periarteritis nodosa since only one out of eight patients with this condition have nodules. It involves any and all sets of arteries in the body, and is characterized clinically by the fact that it attacks one portion of the body at a time and frequently at least for a considerable period allows that portion of the body to be restored to relative normalcy. Characteristically the patient complains of gastro-intestinal symptoms for a few months during which times he usually runs a fever and a high sedimentation rate together with an eosinophilia. He recovers without a definite diagnosis having been made. Next, symptoms and urinary signs of a nephritic syndrome develop and this in like manner subsides. This may be followed by cardiac, cerebral and pulmonary cycles. Ultimately the patient dies in a very high percentage of cases, and it is then determined that he has had essential periarteritis. Certain of these cases are much easier to diagnose because as a matter of pure chance the arteries of the extremities are involved and it is possible for an inflamed nodular artery to be studied, preferably by biopsy.

One of the most dramatic vascular syndromes is that produced by embolism. Embolism may occur from any thrombosed vein in the vascular tree or from the endocardium. Actually a piece of the clot or thrombus breaks off and is carried by the blood stream until it reaches a point in the vascular tree too narrow for it to pass through. There is sudden blockage of the vessel and a relative shock and ischemia of the tissues normally supplied by that vessel. In the case of phlebitis of the legs, for example, the blood clot is carried to the heart and must travel out into the pulmonary circulation resulting in a pulmonary embolism. The patient is suddenly conscious of a very severe pain in one of his lungs. He does not always die of the shock from this type of accident. Another frequent form of embolism occurs when the patient who has auricular fibrillation develops a clot on the valves or in the auricle of the heart. A portion of this clot is then thrown off into the blood stream and lands in one of the arterial branches. If it happens to be a cerebral branch it may result in hemoplegia or other evidences of neurological damage. If it lands in the arteries of a kidney we have what is known as a kidney infarct with evidence of a change. If it lands in an extremity we have the following syndrome: The patient suddenly becomes aware of a sharp pain in the extremity with increasing coldness. The limb becomes pale and later mottled and dusky. No pulsation is felt in the major artery below the level of the blockage, and oscillometric readings become negative for the same area. Unless treatment is instituted promptly there is about a 70 per cent chance that the patient will develop gangrene and lose a portion if not the entire limb, depending on the size of the artery blocked. With conservative treatment between 30-40 per cent of these patients escape without

serious developments. Immediate surgical intervention may improve these figures considerably. Occasionally these emboli may anchor over the crotch of a bifurcation of an artery. We have seen a number of patients in whom this has happened at the bifurcation of the aorta so that both iliac arteries were occluded. This is an almost always fatal accident, but with modern methods of surgery and very prompt attack it has been possible to remove these thrombi.

Let us briefly consider venous pathology. One of the most common types of pathology to be found in the veins is known as phlebitis. This could be divided into thrombo-phlebitis in which instances the intima is seriously involved with the production of a clot which closes off the lumen of the vein; and periphlebitis which tends to attack primarily the adventitia and outer layers of the vein and which is much more painful. Frequently both types are present at the same time. Thrombo-phlebitis usually produces a destruction of the valves of the veins in the areas involved and the after-effects of this may be seen in the development of varicose veins and venous edema with a frequent very late effect being the production of the chronic varicose ulcers which often are so difficult to heal. Occasionally, as a late effect of thrombo-phlebitis, or as a congenital anomaly, we have a true venous aneurysm with enormous dilatation of the veins. It should not be forgotten that sclerosis can occur in the veins just as it does in the arteries, but that it is much less common probably because the veins are not subjected to the same stress of high pressure as the arteries.

As stated above, it is impossible to explore more than the breadth of the problem involved in the field of vascular diseases. My choice, therefore, had to rest between taking one facet and examining it completely or endeavoring to portray with an impressionistic approach a rather wide landscape so that you might see some of these conditions in their proper perspective. I elected to do the latter since I felt that there is an inclination to consider the field in too narrow a light. I hope that this presentation, therefore, will not be considered as a comprehensive study of the problem but rather as a stimulant to encourage further study of the field as a whole.

Speech Therapy for Cerebral Palsy Patients

Joseph Wepman

Introduction

The need for speech therapy for any child is determined largely by the manner and degree in which that child's speech differs from the accepted normals of the community. Speech that is acceptable in certain environments is totally unacceptable elsewhere. These normals are not arbitrary, written rules; they are the sum and total of the language used by the family, the teacher, the neighbors and the entertainment world. Evaluate the problem in these terms; know your goal.

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Development of Speech

Primary in the eventual development of speech is the manner and time of its origin. A comparison of this early period in the spastic and nonspastic is most revealing.

Speech develops ordinarily during the second year of life. Its growth and development is the result of the child's contacts with the world around him. Since almost all experience is new to the infant he has little or no recall to fortify his daily experiences so that only active things react upon him. He must make physical contact with this environment, physical in the sense that he is activated by his primary senses. He must hear, feel, touch or smell in an active, direct manner. Naturally, then, walking usually

precedes speech, for in order to learn by doing, the child must get about in order to accomplish new things.

So, as he walks, or crawls, plays gets into and out of mischief, cries and smiles upon his environment, he is creating situations through which he learns. The need for communication grows as new ideas impinge upon him. His daily needs are rather well cared for in most instances, yet through them he learns that he can command attention by his uttered sounds, purposive or not. The child's first sounds are emotive; they are the result of his feelings, his pleasure and his pain. The world around him makes sound and so does he, in imitation. The child being aware of the totality of his environment realizes as he observes the change that comes over people by the stimulus of sound that he too can affect his environment, and his purely emotive calls become evocative of a response. It is when this occurs that he has begun purposive, communicative speech. The instrumentality of most of this infantile learning is active play. If it is true, as it has been said, that "play activity is a natural urge" then the development of communication through this play is a natural outgrowth of it. Little can be learned by passivity, nothing can be experienced in an active way while prone; inertness is a condition of mental as well as physical inactivity. In order for anyone to learn vicariously, a mental vocabulary is a positive necessity. Dr. A. Brockway once said, "It is a biologic law down through the ages that man has grown mentally in direct ratio to the skill he has developed in the performance of constructive motor activities."

Little more needs to be said to draw the lesson for us. The cerebral palsy patient cannot learn by doing; he is inert and passive in his learning, of necessity. Whatever opportunities are present through activity, whatever learning is accomplished by the unhandicapped child through play, whatever inner stimulus arises as the result of a need to communicate newly discovered ideas is denied the cerebral spastic by the very nature of his disorder. If the spastic walks, it is usually late; many times his speech attempts precede his other motor activities; he is often as harbored from sound as he is from active play by the exigencies of the sick room. When the spastic does develop speech in early infancy it is due to sheer perseverance, excellent guidance and training because he has good mental ability and his mind seeks stimulation. Many spastics, however, start to talk very late in life; their vocabularies like their experiences are meager. Their will to learn may be extensive but their opportunities are few and their mental images are consequently sparse. Speech, you must remember, develops of necessity—the spastic lacks this, his wants are known, his play proscribed, his necessity limited to the primary urge to communicate. I emphasize this phase of development so strongly so that I may urge two things upon you who are so often asked by the parents of these motor handicapped children what they can best do. I urge the extension of proper attention and education at an early age while the mind is formative and suggestibility high, rather than later in life when it becomes so difficult because of the very slow and usually improperly guided early developmental period. Too often, I fear, mental and speech development is allowed to grow like "Topsy"—without guidance or care—while we cultivate the problem presented by the physical disorder. Mind and body are part of a functioning whole; both need training and guidance. This is true in the normal child, and it is even more true of the handicapped child.

MENTAL ABILITY IN THE SPASTIC

The second of the two things that is to be emphasized that does not deal directly with speech therapy but that does deal with preventive measures in speech is the consideration of the mental ability of the diplegic child. Doctor Carlson has stated many times that the common assumption that "spastics" are *ipso facto* mentally retarded is false. Many studies have been made to prove this latter statement. Sirkin's work with the physically handicapped in New Jersey over a period of five years is enlightening. He found that even when the children fell in the group below an I.Q. of 70 that there was improvement where there was cooperation. While in California a study made over a year's time on a thousand spastics revealed that a well balanced program including extended academic training succeeded in improving a majority of them. Yet the argument is still made and the treatment is still condoned wherein the spastic is considered a mental defective and the classroom teacher for want of time or space, if for no other reason, sends the spastic to the ungraded room or some similar "discarded" room for his education. It is argued that the spastic is slow in learning, that ideational training, which usually has never been tried, would be a waste, that the

spastic must first learn to control his musculature. Unfortunately these arguments are true enough to bear some weight; they are, however, only part truths and, like all truths of that kind, need analysis and examination.

The spastic with normal or nearly normal intelligence is no slower in learning than are others in the same mental categories. Spasticity, it must be remembered, is a matter of degree. The spastic whose primary disorder is complicated by aphasia, by severe hearing loss or by cerebral agenesis is difficult to teach not because of any inherent difficulty due to the spasticity but because of the nature of his complicating disorder. But all sufferers from these disorders are difficult to teach whether they are spastic or not. The diplegic's difficulty is one of muscular control—not one of mental ability.

Three considerations are urged upon us by those who would consider the spastic as other than normal in intelligence.

First, the spastic's failure to learn to speak at a normal age is usually a main feature. His lack of facility in the use of language forms, another; his low mental quotient as revealed in standardized tests, still another. The first two of these reasons, as we have demonstrated early in this paper, are not cogent as a proof of mental deficiency. The third will bear some further examination.

Standardized tests were developed during the last two decades in an attempt to measure the mental potential of the various normals and abnormals in our population. They were originally almost completely verbal and as such were applied only to those people with an adequate command of the language. Later, nonverbal forms were added and with the influx of these it was assumed that anyone could be tested and measured for his or her lack or gain upon comparison with the standard for their age group. At no time, and I say this without wishing to enter into the continuous discussion concerning the efficacy of the intelligence test, has there been a test designed to measure the physically handicapped child who has in addition to this handicap, difficult speech and poor command of the language. Because of this no adequate statement can be made of the true mental quotient of the spastic. It is time we stopped giving these examinations or stopped considering the results as computed, as the answer to the question of whether our spastic children are high or low in intelligence. Bronson Crothers in his classic description of the birth injured is responsible for the opinion that "It is entirely possible to have complete disorganization of motor control without mental defect." Let us not throw away the spastic's school books in favor of a total program of physical therapy. Rather, let us work out a balanced program combining the best features of both. It may be true, as Doctor Carlson has said, that "we will never succeed in making these patients into normal people even if their mentality is normal," but certainly we will fail in our efforts toward rehabilitation if we accept them as hopeless from the start. In these two particulars, then, let me repeat—we need to rearrange our usual thinking. First, the birth injured needs attention from an educational viewpoint from early childhood, not after he has reached some school for the handicapped. Secondly, we should discard the notion that spastics are mentally retarded, *per se*, and therefore belong with others that are mentally retarded in our educative efforts. With this accomplished our efforts toward speech reeducation will be enhanced, we will have a better fundamental basis upon which to work and we will have cleared the way for advanced educative processes.

DIFFERENTIAL DIAGNOSIS IN SPEECH

The speech of the motor-handicapped is termed "dysphasia." It includes the changes in voice, rhythm and articulation that are manifest in the disorder. Normal production of speech is comparable to the production of music on a wind instrument, where the vibration of the air stream is produced by the reed mouthpiece while the various notes of the scale are made by altering the resonator in a way peculiar to each note. Man performs a similar act in speaking. He produces vibrations at the vocal cords and then alters the vibrating air stream in the mouth so as to produce a condition peculiar to each sound in the language. This alteration of position is called articulation in which we must be able to raise and lower the tongue, purse the lips and move the soft palate. Although in study we can visualize each position as a positive and arbitrary one, yet in speech we move through the positions rather than hold them. Speech is active, not static, and the ability to produce each sound in isolation is of little value in the production of intelligible flowing, rhythmic speech. The spastic with poor articulation suffers from an inability to control the musculature of articulation suf-

ficiently well to move rapidly from one sound to another as speech demands. His overtension causes him to elide and omit sounds, especially those at the end of words and those that require the greatest change of position. So in differential diagnosis we are concerned first with the tension of the patient's musculature of articulation.

Common to spastics is a poor diadochokinetic rate. This is simply the ability to make repetitive muscular movements at a speed equal to the demands of normal speech. The disability engendered by this shortcoming is apparent in the spastic's slow and halting speech attempts, the scanning enunciation that is so often heard.

The accuracy of speech in all of us is determined by our ability to hear. We learn through hearing and we use new sounds by guiding their production through our hearing acuity. Naturally, all of the defects of speech due to a loss of hearing are present in the spastic whose threshold of hearing is raised beyond the normal. Hearing, however, is more than acuity. We must be able to discriminate between sounds that are very much alike or we will substitute one for the other. This faculty is called "auditory discrimination" and its failure or weakness results in the commonly heard "baby-talk" of children as well as the substitutions heard in spastics. Auditory discrimination is an ability that is now being studied. A test has been prepared and is being standardized to show the normal deviations in this very important faculty. The test is simple; it requires only an ability to recognize as two words are read aloud whether one word has been repeated or two different words have been read. No standards at present are available for spastics, but in my experience with the test over the past two years, spastics have fallen far below the normals for their age groups.

Another little-considered hearing propensity is the "auditory memory span." We are aware that a short span indicates an inability to hold in immediate memory a sufficient number of sounds to complete a multisyllabic word or even a word of one syllable but with a series of consonants in it. At present no satisfactory standards are available to measure the auditory span, but frequently the result of very simple testing reveals the span to be so short that almost all final and medial consonants are omitted.

Any discussion of voice and rhythm in differential diagnosis depends not upon tests but upon the examiner's ability to recognize normal voice and rhythm patterns. Pitch is determined by the size and shape of the resonators, by the tension at the cords and by the intratracheal air pressure. The size and shape of the resonators are almost entirely fixed quantities. Only by changes in the position of the larynx in the throat can the size be changed. Almost invariably the larynx of a spastic is held high in the throat. This can be determined by palpating it with the forefinger. Increased tension at the cords can be determined only subjectively—the voice is hoarse, high-pitched and quavering during overly-increased tension. The factor of subglottic pressure is determined by the force of the respiratory act. During speech an increased respiration is vital in order to maintain normal volume and pitch.

The rhythm of speech likewise is determined subjectively. Speech should be smooth and flowing. The sudden explosive emissions that characterize spastic speech in many instances are due to a lack of coordination in the laryngeal area. The overtension at the cords results in their complete closure followed by the sudden total opening of the cords which permits the air column imprisoned in the subglottic area to burst out rather than flow out evenly. Rhythm and pitch are interlinked, for this increase of air pressure in the trachea tends to raise the pitch of the voice. Likewise the smooth control over volume is lost since volume like pitch is partially controlled by the quantity of air passing through the cords at a given moment.

Other modifications of the normal in speech are noticeable in some spastics. The monotone in voice due to an inability to control the output of air for inflectional changes; the staccato-like speech which results from the lack of rhythm; the facial grimaces which have their effect upon articulation; the nasality of the voice due to a faulty control over the nasopharyngeal sphincter, the slow scanning type of speech that the spastic uses as his defense against other more asocial speech habits, all of these take their toll on normal speech attempts. They are all pathognomonic of the motor-handicapped. When the disabilities here mentioned are present singularly, the effect on speech is to make it somewhat other than normal. When, however, many of these stigmata are present speech becomes something labored, as difficult to listen to as it is to produce.

Proper differential diagnosis of the speech

problem presented by the cerebral palsy patient is important because it determines the course of therapy. It is useless to treat a tongue that is too rigid by the exercises that are applicable to a speech problem present because of poor auditory discrimination or a short auditory memory span.

Just as there are all degrees of spasticity as well as all degrees of mentality among the diplegic so too are there speech technics for each type of spastic speech. First for several generalities—technics that are applicable to almost all spastics because of the very nature of the disorder.

If the patient is old enough to have insight into the nature of the problem he possesses, it is wise if he recognize the limitations under which he will always suffer. He should know that complete normalcy is impracticable. He must be content to achieve an approach to an ideal; an alleviation, not a cure. If the patient is old enough and intelligent enough to accept it, keeping the practical goal in mind will assist materially in solving the psychological burden that is frequently so heavy, as well as to simplify the task of the speech therapist. With insight will come confidence as improvement is shown.

Relaxation of overtensed spastic musculature is the second essential. This is as important to speech as to other motor activities. Overtension of the speech musculature leads to slow, indistinct speech replete with substitutions of easily made sounds for the more difficult ones. Teaching the automaticity of speech to older spastics is excellent in this regard for with the realization of this important fact tension will be reduced by the decreased effort expended. In general it is wise to begin relaxation of the fine muscles of speech after the major muscles have been relaxed.

The presence of disdiadochokinesis in spastics of all types and degrees and the speech problem that results necessitates a continuous therapy. Timed movements of the muscles used in speech will help the patient visualize his efforts. Practice any repetitive movement, with or without sound. I always use five such movement exercises. The tongue is moved in three ways, by repeating "la", "ptk" and "utk". The lips by a repetition of the vowels oo and e and their reverse e and oo in combination emphasize the movement of the lips on each sound. The first aim is accuracy of production extending to speed as the patient is able to do so.

Hearing for speech is an ever-present problem. Loss of hearing acuity leads to the typical speech of the deafened. Naturally when paralysis is added the problem becomes complicated. The actual defects are correctable only by the technics available for teaching the hard of hearing. The educative process should be in the hands of a trained teacher of the deaf. Through visualization, cutaneous contact, lip reading and similar methods the speech can be improved. The prognosis is less good than for the spastic whose problem is uncomplicated in this regard.

Lessened ability to discriminate between sounds as described under differential diagnosis holds more hope for the therapist. When this condition is diagnosed, treatment should follow a very definite approach. For example, if the spastic substitutes a front tongue "t" for a back tongue "k", or vice versa, word pairs or nonsense syllables should be constructed that differ only in those sounds, as "cook" and "took" or "mate" and "make". These word pairs should then be drilled until the patient's ear recognizes the difference between them. Then a use of the correct word in short sentences frequently will overcome the defect.

Short auditory memory spans are less hopeful. Technics in therapy concern only the drill on sounds, increasing in number as the patient's ability to reproduce more sounds increases. This is slow and arduous work; the results are not sure but the problem is a serious one and any success repays the effort expended.

Voice problems such as the change in pitch, the staccato enunciation, the intermittent changes in volume usually will respond to drill on use of a low monotone. This can be assisted by palpation of the larynx. Abnormal pitch and volume controls invariably show an alteration of the normal position and activity of the larynx in the throat. Normally it should be held low in the throat and its movement should be restricted to a vibratory motion. By being conscious of what the larynx is doing and what it should do plus finger palpation during phonation one frequently will be assisted in obtaining the desired control.

Important to normal speech is the rhythmical utterance that is so upset in most spastics. In order to assist these handicapped in the production of normal rhythms the use of music is invaluable. Its uses in general muscular therapy is well known. In speech it is less well known but of equal importance. All speech is essen-

tially rhythmical, the nuances of tone, the flow of language, the stress of the vowel—all are musical. When music is used, we distract from the monotony of formal drill and the tension of concentration on a particular speech act is removed.

The primary problems that lead to speech difficulties as here enumerated are tension, repetition, hearing, voice and rhythm. There are others that appear less frequently but are debilitating to speech when they are present. These include the facial grimaces that come from effort in speech production. Teach the automaticity of speech, the concentration on "what you are saying" rather than "how you are saying it," the effortless breathing act and its close relation to the similar speech act, the trick of "*letting* yourself talk" as opposed to "*making* yourself do it" and the facial contortions will tend to disappear.

Another of these fairly common difficulties is nasality due to an immobility of the soft palate. Therapy should center about "blowing". The muscular result of increased blowing will be movement of the soft palate. Younger children should begin with simple blowing exercises such as bubble pipes, while older children can play simple musical instruments, and adolescents and adults will find reed wind instruments of great value. There is a fine carry-over from these involuntary muscular practices. The end result can be assisted by teaching the patient to recognize the difference between nasalized and oralized utterance. One of the most ancient of axioms is that "nothing succeeds like success," apply this to blowing, suggest an act that can be accomplished easily and progress to more difficult procedures when the patient is capable of performing them. One of the simpler dangers to avoid during the blowing act is that of holding the external nares which obviates the desired movement of the soft palate. The last of these occasional problems is that of the scanning type of speech that we hear in spastics. Training for this should concern the length of vowels. Drill for the short vowel, the lightly held sound; glide through the vowel sound, do not hold it.

The foregoing sections on speech diagnosis and therapy are more or less specific. No attempt is made to suggest that these are all of the problems of speech found in spastic diplegia; they are, however, the most common. One thought to bear in mind is that all speech therapy should be guided by common sense, if it is not it will fail in achieving its purpose. No arbitrary rules are possible; each child presents a different problem that must be dealt with according to the exigencies of the moment.

CONCLUSION

Speech therapy is determined by more than the problem exhibited. The time and rate of development, the intelligence of the individual and the differential diagnosis all are important. Be cautious in your approach. One hour of properly directed therapy is of more value than weeks of misdirected guidance. Keep in mind the comparison between the spastic and the normal. The muscular development will be of importance only if the child is trained to make intelligent use of his muscles. Above all remember you are dealing with a human problem, not a mathematical one.

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Sir Robert Jones visited Baschurch (a tiny village in Shropshire, England), and it was from that association that the first open-air hospital for crippled children was established. With his long experience of the courage and charm of suffering children, Robert Jones had always fought to dethrone the public delusion that they were by necessity fractious and morose. Every boy and girl was made to realize that he or she was of service in the world, and they were taught the joy and morality of work.—*From "The Life of Sir Robert Jones" by Frederick Watson.*

A New Chart System for Recording Joint Measurements

C. O. Molander, M.D., and Bertha Weinmann, M.D.

Many attempts were made to agree upon a simple and accurate system for recording measurements in range of motion. But in comparing and studying the different descriptions of methods and instruments for this purpose, we must acknowledge that there exists a deplorable confusion of terms. Some authors refer only to the angle included between the two bones concerned in the movement, others describe the angle between one of the bones and an imaginary line projected into space. Some make the angle in extreme extension the basic angle, others various "neutral" positions, which may vary in different individuals. There is confusion due to the fact that sometimes a half-circle arc from 0-180 degrees is used, and at other times a full arc of 360 degrees.

Most of us agree that the adoption of a uniform system of recording would be of great value to all.

The measurement of range of motion and recording of the exact angle serves different purposes. In the first place the accurate record is a great help to the surgeon, the physician, the physical therapist and occupational therapist. An objective measurement shows the physician the amount of improvement and enables him to compare results of different treatments and changes in different stages of disease and recovery.

One must not forget the psychological effect of such records upon the patient. We must consider the importance that such records have as a means for demonstrating to the patient the value and result of treatment. Succeeding measurements show him the effects and benefits of therapy and inspire him to increase his efforts. Besides giving him encouragement and arousing interest, we induce another factor, the spirit of competition. This change in the mental attitude of a formerly unresponsive patient as a rule is an important factor in recovery.

Various systems and many instruments, called fleximeters, arthrometers, goniometers, flexo-extensometers, phalangofleximeters and protractors, have been devised by different authors. Wiechec and Krusen[1] give an interesting and complete survey of apparatus and systems used. We, in the Physical Therapy Department of Michael Reese Hospital in Chicago, use Dr. David Silver's protractor as described in the JOURNAL OF BONE AND JOINT SURGERY,[2] and we find it most satisfactory.

However, there still is more disagreement relative to recording range of motion than as to the kind of instruments and systems used. Descriptive notes, figures, (which may be interpreted in different ways by different readers), graphs, diagrams and photographs are used.

Here at Michael Reese Hospital, we devised a set of charts for recording range of motion. We have found this system very helpful and very easy to understand and interpret, and we hope that others may find it useful. It seems to be an advantage to be able to compare at one glance the patient's range of motion with the average normal range.

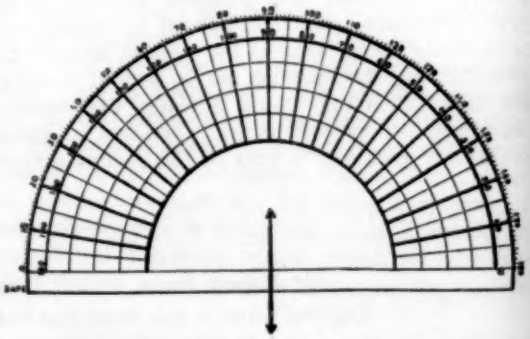

Fig. 1. Chart for recording range of motion.

We had forms printed showing a half-circle protractor scale ranging from zero to 180 degrees and from 180 degrees to zero (Fig. 1). The four empty half-circle spaces are used for recording measurements at four different times so that

Michael Reese Hospital, Chicago, Ill.

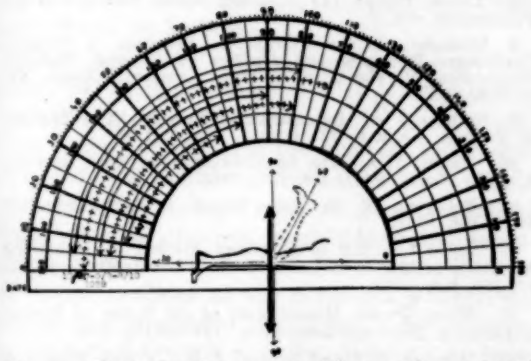

Fig. 2. Chart showing record of knee action as tested on three succeeding months. Crossed line indicates passive motion; straight line indicates active motion.

changes from week to week or month to month can be easily compared (Fig. 2).

In conjunction with the printed charts we have a set of rubber stamps, each fitting into the center of the printed chart. These stamps depict all of the movements of the different joints. Each stamp shows the average normal range of movement in dotted lines and the figures in degrees for complete motion. For example, Figure 3-A shows the stamp for knee flexion and extension. Here we read the complete extension as 180 degrees; the flexion toward zero degrees goes to 60 degrees in the average healthy person.

We accepted Dr. F. H. Krusen's terminology with a few exceptions for graphic reasons. He gives the rule as follows: the zero end of the arc is toward the head. Measurements of movements made toward the head (in the anterio-posterior planes) will read toward zero degrees. Measurements of movements away from the head will read towards 180 degrees. Extension (in most joints) in movement towards 180 degrees, flexion towards zero degrees. We use this rule for measuring flexion and extension in the hip joint, the knee, the elbow (Fig. 3-B) and the fingers. Adduction of the legs (Fig. 3-C) goes to 90 degrees, abduction (towards zero) goes to 45 degrees in the average person. Rotation of the arm and of the leg (Fig. 3-D) and of the foot (Fig. 3-E) is recorded as inward rotation from 90 to zero degrees and as outward rotation from zero to 90 degrees. Volar flexion and dorsal flexion of the wrist, radial and ulnar deviation of the wrist (Fig. 3-F) are recorded from 90 towards zero degrees for graphic reasons. The same is done for pronation and supination of the arm.

In using these charts it is just as easy to compare the patient's range of motion with the average normal one as to check upon increase or decrease of the angle from one test to the other.

As there often is marked difference between active and passive range of motion, (for example, in cases of flaccid paralysis, neural injury or arthritis), we use a red line to record the active range and a blue line to record the passive range. These lines are drawn with colored pencils with the help of a compass. This gives excellent opportunities for optical evaluation of changes. The physician has a clear picture of increase or decrease of motion at the first look instead of stopping to compute the differences as in written schemes.

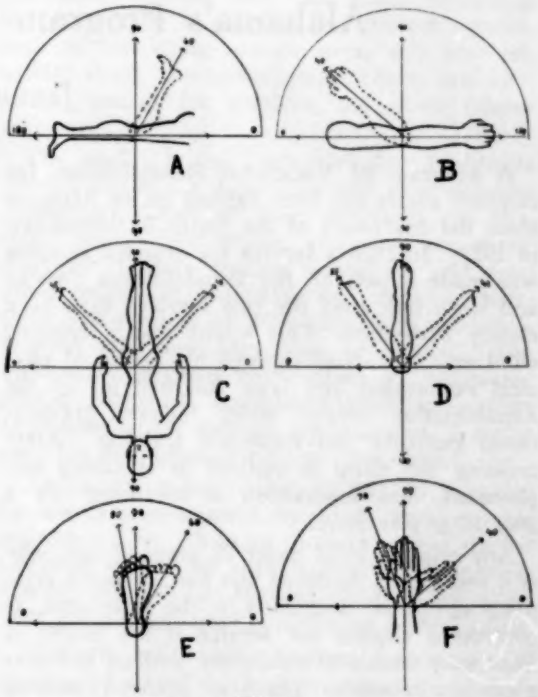

Fig. 3.

It is impossible to show all of our charts, as the whole set consists of nineteen different stamps. However, in conclusion, we hope that these charts will assist in overcoming some of the difficulties in the field of objective measurements and recordings of range of motion.

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Alabama's Program for Crippled Children

Jennie Dean

A program of Vocational Rehabilitation for crippled adults has been carried on in Alabama since the enactment of the Smith-Bankhead law in 1921. In 1926 a service for crippled children was made a part of the Rehabilitation Service and since that time the two services have been closely associated. This means that a crippled child may be carried through his period of physical restoration and later followed up by the Rehabilitation Service which includes prevocational guidance and vocational training. After training the client is assisted in obtaining employment, and supervision is continued for a year after placement.

Any crippled child under 21 years of age, who is a resident of Alabama and has a type of crippling condition designated in the state plan, is considered eligible for service if the family is financially unable to obtain the medical and surgical care he needs. The State agency is making an effort to have new cases referred to the Service through the signing of referral cards by the family physician or by the county health officer if there is no physician in attendance. A social and financial statement on the family is later obtained in order to eliminate abuses of clinic privileges.

Thirty-five itinerant clinics are to be held this year throughout the state. In addition to this number there are four hospital centers where weekly clinics are held. An orthopedic physician examines the children and makes recommendations. Three or more staff workers from the State Service are also in attendance. They explain the physician's recommendations to the family and make necessary plans with them for the child's care and treatment. A bracemaker is present to take measurements and make adjustments in braces. Volunteer workers assist in the organization of the clinic preceding the physician's examinations. Another very helpful phase of the lay group's activity is the serving of lunches to children attending the itinerant clinics. Some members of the health and social service departments of the counties represented are present to obtain the recommendations of the physician. They follow up the child in the home more often than the staff worker is able to make calls.

No child under the care of the State Crippled Children's Service is hospitalized in a public institution. Hospitals in the four centers of Alabama in which the orthopedic surgeons are residents are utilized. Cases from northern Alabama are treated in one of three Birmingham hospitals. One hospital in Selma cares for white children and another for colored patients. The

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Assistant Supervisor, Alabama State Crippled Children's Service.

same is true in Mobile. Colored children only are treated at Tuskegee.

The "365 Club," only private agency in Alabama providing treatment for crippled children, maintains a convalescent home in Birmingham. The State Service pays the club an established rate for white children kept in the home. This rate includes such services as general medical care, physical therapy, pool treatments, laboratory work, splints and Bradford frames. Other facilities available at the home are a solarium, playground equipment, respirator, x-ray services, occupational therapy and photography. At present two teachers and an occupational therapist are being provided by the Federal Works Progress Administration for work in the convalescent home. Through this administration a teacher also is provided at each hospital where crippled children are kept. Plans are under way for convalescent care of colored children in foster homes in Birmingham and Tuskegee. A satisfactory boarding home in Mobile is used by the Service for colored children from the southern part of the state. If adequate care cannot be given in a foster home the colored child is kept in a hospital.

About ten spastic children under care of the State Service are maintained in the Charlanne School of Birmingham. The school also takes private patients from Alabama and neighboring states. This institution is a motor reeducation and speech clinic, established in 1936. The child is given academic instruction, physical therapy, occupational therapy and speech training according to his needs. Pediatric, neurological and orthopedic supervision by specialists in these respective fields is a part of the service given by the school. The State Service plans to keep a child in school for from three to six months and then send him home for a time. If the child's progress in school warrants further expenditures in that line he is sent back for a later training period.

The National Infantile Paralysis Foundation has established an Infantile Paralysis Center on the campus of Tuskegee Institute, the world's largest institution of higher education for Negroes. The State Service will share in the advantages and facilities of the building which will be similar to the unit at Warm Springs for white patients.

Excellent assistance in follow-up care for children dismissed from the hospitals is provided by the county health units and welfare departments. Information as to the treatment given in the hospital and the physician's recommendations for follow-up care are sent directly to the local county health units. Social service workers render valuable services in helping the child to make proper adjustments at home and in the community. The attendance supervisor from the county education department helps the child in making adjustments at school and in the community. Clubs and individuals frequently help financially in meeting the children's needs, such as furnishing orange juice, cod liver oil, special shoes, transportation to clinics and hospitals, lunches for children and other related services.

The staff of the State Crippled Children's Service includes a supervisor and four assistant supervisors. Two of these assistants are physical therapy technicians and two are social workers. A state medical consultant and four other orthopedic physicians are employed part-time. The services of these physicians are available at any time they may be needed. The orthopedic surgeons refer cases to designated plastic surgeons, ophthalmologists and other physicians whose services are indicated. A fee is paid for such treatment given state cases.

An annual appropriation of $80,766 provided by law is supplemented by funds from private sources. The Alabama Society for Crippled Children, a state lay organization, raised approximately $25,000 for crippled children last year. This amount was used in matching federal funds.

Welfare, health and education departments of state and counties are highly cooperative in their respective fields. However, the responsibility for the administration of the State Crippled Children's Service in Alabama falls directly under the State Department of Education.

Posture in Relation to Nutrition

Ella Mary George, M.A., M.D.

Good posture cannot be defined simply, because it includes knowing, thinking, feeling and doing. "Good posture is the body in readiness."[1] Doctor Campbell states that posture means "the relation of the body to space, that is, carriage;" it is a gesture, and the person's adaptation to life.[2] In good standing posture the feet are parallel and two to three inches apart, the knees pointing straight ahead, in easy extension, the thighs rotated slightly outward and head erect. "The contraction of the glutei maximi will prevent the pelvis from tilting too far forward, and the tonic action in the rectus femoris and psoas and iliacus on both sides will keep the pelvis from becoming too horizontal."[3] There is only one good sitting posture, with hips pushed back and chest poised over the thighs so that the weight is supported by the ischia and thighs, with their thick muscle pads; the normal curve of the lumbar spine is maintained.

"Normally in the upright position an individual when at rest is supposed to carry his weight on his bones and not on his muscles or ligaments. The center of gravity generally falls in a line running from the tip of the mastoid, through the front of the shoulder, the great trochanter, just back of the patella, and about an inch in front of the external malleolus."[4] In describing and demonstrating good standing posture one should have feet parallel with toes pointing straight ahead, knees slightly relaxed, abdomen up and in, hips back and down, with head up and chin in and the shoulders will take care of themselves. People can get into the habit of standing and sitting tall. The school children are told to sit on their hips and not on the end of their spines.

Good posture in young children differs some from adult posture due to their diet of more liquids and less solid food. "Normal posture of younger children includes a prominent abdomen and lumbar lordosis with usually a very straight upper back." The preadolescent child still shows the same posture to a lesser degree.[5]

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By assuming good posture one can elevate his feelings. A brisk walk with body erect and an easy swing can give one a sense of well being and make the next task appear easier.

"Fatigue posture" is the opposite of good posture; it tends to make the person more tired the longer it remains. It does not breed confidence in one's ability to command a situation as does good posture. "The Ode to Posture," written by one of Miss Drew's students, expresses this idea in a convincing way. The person with typical "fatigue posture" has "(a) head too far forward, (b) chest flat, (c) abdomen relaxed and prominent, (d) back curves exaggerated."[6] A tired child will hold the head downward and forward with shoulders stooped and narrow, with abdomen prominent and frequently with knees hyperextended and feet pronated. Muscular fatigue results, with circulatory congestion in the muscles and viscera, when the viscera are crowded down by a narrowed chest cavity and lowered diaphragm.

In discussing posture there are certain structural deformities that must be considered. In speaking of orthopedic defects we mean those which to a large extent can be prevented or corrected. These would include flat or pronated feet, knock-knees, bow legs or arms, deformities of the hip joint, exaggerated spinal curves and scoliosis. The development of these will be discussed under vitamin and mineral deficiencies as causes of malnutrition.

Visceroptosis means sagging or dropping of viscera, but among some medical people it is thought that many thin individuals started out with low viscera and there has been no definite change. There is an operation to anchor the colon which usually is less satisfactory than rest and sufficient gain in weight to hold the viscera in place. Visceroptosis has been defined as a "prolapse or falling down of abdominal viscera so that they lie below their normal position in the abdominal cavity."[7] The subjective symptoms are general weakness, lack of stamina, poor dietary habits, constipation, lack of appetite, nervous irritability and occipital headache or pain in the back of the neck. Objective symptoms

are: a definite posture with "the long, narrow chest, protuberant abdomen, sway or straight back, round shoulders, forward projection of the head and general lack of muscle tone;" also underweight, hypermobility of abdominal organs and x-ray diagnosis.

There is interference with blood and nerve supply due to strain, with resulting inefficient work when organs are held in disadvantageous positions. The stomach fails to function and the intestines lose their good tone with resulting indigestion. Visceroptosis is an indication of a general constitutional disturbance characterized by laxness of the mesenteric and peritoneal attachments so that the abdominal viscera occupy abnormally low positions. It is associated with atony or asthenia of most smooth muscles of the body and is either congenital or acquired as the result of poor body mechanics, prolonged illness or acute infection.[8] An underweight condition may be due partly to inefficient digestion and partly to improper assimilation of food.[9]

Malnutrition means some defect in nutrition arising from lack of food, either in quantity or quality, improper assimilation and fatigue or illness. The faulty diet may be insufficient in kind or amount, but poor dietary habits may have even more influence such as skipping meals, eating too little or in too great haste. One's meals should include fruit, vegetables, milk and the proper balance of carbohydrates.

Decrease or loss of appetite occurs from mechanical obstruction by enlarged tonsils and adenoids and from absorption of toxins from diseased tonsils, adenoids or teeth. "The lungs are insufficiently oxygenated, sleeping is difficult and food intake is greatly decreased."[9] Malocclusion will cause malnutrition because the child does not feel comfortable while eating, so cuts down on his intake and probably fails to masticate properly the food taken. Correction of these defects causes return of appetite with better nutrition and general health; gain in weight and appearance are striking at times.

Any chronic disease or acute condition may cause malnutrition; nourishing food is an important factor in health or illness. An excellent outline of causes of malnutrition is given by Turner in his book entitled "Principles of Health Education" but is too long to copy in detail.[10]

The term "underweight" is not necessarily synonymous with malnutrition. A slender person can be well nourished with normal muscles and organs and enough fat to cover the ribs and muscles. The height-weight-age scales are not as popular now as they were formerly because individual differences, heredity and even environment must be taken into consideration. Worry over a lack of pounds would tend to reduce rather than put on more weight; it is better to live hygienically from all angles and be fit, no matter what the number of pounds. The underweight person has less reserve than the person with "normal weight" and is apt to fatigue more easily; he is unable to store his food and has to eat more frequently to keep going. Rest and sleep will be discussed with fatigue.

To judge the state of nutrition, it is necessary to do more than inspect—the examiner needs to palpate or feel the extremities. When soft, flabby tissues are present, there is malnutrition no matter how much adipose tissue is present. A healthy child has a good color with bright eyes while malnutrition may cause pallor or sallowness and lusterless eyes. Due to improper diet and lack of resistance the overweight individual is as apt to tire as the underweight individual. "Such individuals are often anemic, listless, tire easily, take infectious diseases readily, and when seriously ill are more apt to succumb than those who have better nourished tissues and greater vitality."

The disadvantages of overweight are: inconvenience of getting about due to heaviness on the feet, disfigurement, inefficiency due to lessening of muscular activity, lack of ambition, mental sluggishness, predisposition to functional diseases and lessening of life expectancy.

Fatigue is a natural result of body activity, but there should be rapid recovery following rest, food and sleep. Overfatigue occurs frequently with the malnourished and is "a better gauge of malnutrition than actual weight."[3] Frequently the individual who tires easily is the one who is underweight and is suffering from visceroptosis; he does not know how well he might feel. Fatigue occurs when the intake of food does not compensate for the output of energy in exercise; the individual has difficulty in sleeping, is hyperirritable and loses his appetite. The more restless and irritable the child becomes the more rest he needs; rest in bed during the day, after each meal if possible, and an early bedtime will bring good results. Many times mothers are amazed to find what rest will do for a child, or even the whole family.

Lack of iron leads to secondary anemia and this is so closely related to what has been said about overfatigue that it is scarcely necessary to

discuss it further. The symptoms of anemia are "paleness, weakness, shortness of breath, lack of appetite, and slowing up of all vital functions" and frequently a sensation of chilliness.

Doctor Emerson, after twenty years' work, decided that habitual overfatigue is more responsible for malnutrition than any other cause. These children kept late hours, had extra club work or other work, classes in music or dancing or unhappy home conditions. Too often adults drive children and fail to see that they are overstimulated and often exhausted.

Vitamin deficiencies in this discussion include only A, B, C and D as they relate particularly to posture. "Dietary insufficiency in infancy or youth may cause conditions which cannot be repaired by any dietary measure in later life."[11] Lack of vitamin A is related only in that it affects normal growth; secondary infections occur from damage to tissues followed by the invasion of bacteria, and nervous lesions may develop causing poor coordination.

Vitamin B deficiency causes lack of appetite and constipation; both favor malnutrition and fatigability. Prolonged lack of this vitamin causes polyneuritis and damage to the nervous tissue resulting in paralysis of the muscles, especially the legs. A case of beri-beri was reported several years ago in which the patient developed dropping of both wrists and ankles, as well as gradual paralysis of forearms and legs with very weak neck extensors, but no pain. The gait was unsteady and shuffling.[12]

Lack of vitamin C causes soreness and bleeding around joints with fragile bones. "Many cases of fleeting pains in the legs and joints which are commonly supposed to be rheumatism are doubtless due to lack of vitamin C and would clear up by taking large quantities of this vitamin."[6] There may be petechiæ about hair folicles making the thighs browny and tender. "The patient dislikes to stand or walk and often affects a rather characteristic standing position with legs slightly flexed."[13] X-rays show thinning and rarefaction of the cortex.

Vitamin D is the vitamin most often suspected when bony deformities are found, and rightly so, because there must be a combination of it along with sunshine and metabolism of calcium and phosphorus for proper development. "Its presence is needed to maintain a proper level of these elements in the blood and to enable them to be deposited in growing bones." Its lack causes soft bones which are unable to calcify properly. "The most characteristic feature of the disease is soft bones which bend under the weight of the body and develop all sorts of curvatures and deformities which may persist in later life"[6] such as knock-knees, bow legs, bowed arms, spinal curvatures, narrow distorted chests, pigeon breasts and "pot bellies."

Occasionally a child who is old enough to walk will refuse to do so on account of pain in the epiphyses on weight bearing; after tenderness disappears, deformities develop. Spinal curvatures develop from softening of vertebrae followed by the erect position. Coxa vara so deforms the femurs that the trochanters are high and the child walks with hollow back and waddling gait. If proper protection with orthopedic rest of parts is provided, rachitic deformities need not develop while the bones are soft. Stress of unbalanced muscle action or gravity causes deformity; a child sitting cross legged for hours with bowed back will develop misshapen vertebrae and leg bones.[14]

Osteomalacia occuring in adults and occasionally in adolescent women is an overgrowth of osteoid tissue in bones; thus the bones are robbed of calcium and phosphorus already deposited. The pelvis, lower spine and lower extremities are affected, giving bending and contractures. There may be pronounced weakness of the adductors of the thigh.[13]

From the separate discussions of posture and nutrition, we see that the two are very definitely related and it is difficult to say which is cause or effect. The person who is "up to par" in every respect has both good nutrition and good posture; that is, he has good body development which has been derived through sufficient exercise and rest, lack of overfatigue, sufficient food of the right kind and the proper psychological uplift. Daniel and his companions of Bible times are good examples of what the right food will do for one physically and mentally; while the extreme opposite is seen in the dementia praecox patient, at the New Jersey State Hospital, with her poorly nourished body and constant sitting posture of utter dejection refusing to be aroused.

It is desirable to create interest in posture and the prevention and correction of abnormalities, but it is of little value unless the case is "followed by a physician who can give instruction regarding mineral metabolism, dietary balance and normal health habits."[15] "Fatigue posture" so frequently accompanies malnutrition and underweight that one pictures a thin individual with lack of energy and wishes at once to feed him frequently and give him extra rest and sleep, and

exercise when he is better fitted for activity.

Visceroptosis is often found in the thin, malnourished person, whether symptoms are present or not. The patient complaining of fatigue, leg ache and foot ache, nervousness and irritability, restlessness at night and failure to gain weight, with constipation, should be examined carefully for sagging viscera which cause disturbances in the nervous and circulatory systems. He should be placed on a rigid regime of rest and diet with corrective exercises and other activities at the proper time. Outdoor activity should be stressed in the growing child for physical, mental and social development.

Since the underlying causes of malnutrition have been given as ignorance, lack of home control and poverty, it is the duty of the parent to inform himself and put into practice what he learns. Sufficient income does not guarantee proper nutrition for all, though the child who can afford to have defects corrected and to eat the proper foods should be given the chance to develop normally and not be hampered by fad or fancy of the parent.

Many children, and adults also, have gained weight and improved in general health following correction of remedial defects. "It is a well established fact that nutritional status and muscular development are important influences in the production of deformity and physical defects."[16]

The posture of the obese person gives the effect of stooping to avoid overhead obstruction, the appearance of extreme relaxation. The abdomen is round and protuberant, with increased lumbar and thoracic curves and arms suspended in front, pelvis tilted backward, knees flexed and head and neck well forward with eyes elevated to retain the horizontal vision.[17]

Posture soon shows the effects of vitamin deficiency following infectious diseases from lowered resistance brought on by lack of vitamin A, and from poor appetite and constipation; and in severe cases polyneuritis and paralysis from lack of vitamin B, pains and tenderness of joints from vitamin C deficiency make walking and standing difficult and even lead to flexion deformity of the legs. But the most marked postural deformities result from lack of vitamin D. The chest and spinal deformities and those of the extremities, especially bowing, give the individual an unattractive, and at times grotesque appearance which cannot be entirely corrected even by orthopedic surgery and remain as constant reminders of the lack of vitamin D with proper calcium and phosphorus metabolism.

This study shows very definitely the need for preventive medicine. No child would ask to be abnormal; he should have the benefit of all the knowledge on posture and nutrition that study and research have developed. With proper food, care, rest, sleep and exercise, in the absence of chronic or acute disease, children should develop normally with resulting good nutrition and posture.

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Twentieth Annual Convention

In the December 1922 issue of THE P. T. REVIEW there is an editorial which reads as follows: "The First National Convention of the American Physiotherapy Association was held in Boston, September 13th to 16th, inclusive, and proved to be even more of a success than anyone dared hope.

"There were representatives and delegates from nearly every section of the country and local chapters. . . . The California Association seems to have been particularly active and progressive."

The plans for the Twentieth Annual Convention show that the members from California have continued to be active and progressive. A new type of convention or conference is to be inaugurated this year with the Northern California Chapter as hostess. We feel certain that in our editorial following the 1941 convention we will be able to say, as they did in 1922, that it "proved to be even more of a success than anyone dared hope." The American Physiotherapy Association and the hostess chapter are offering us a great opportunity for further study and discussions. If the enthusiasm of the members of the Illinois Chapter for their short muscle study course which was held earlier this year is any indication of the response to this type of meeting, the Twentieth Annual Convention should bring even greater stimulus.

Plan now to go to the 1941 convention in California—show your support of the Association by attending! Referring again to the editorial of December 1922: "From this 'get together' should arise a better, clearer understanding of our aims. Although the structure of our Association is still more or less incomplete, it is built on a rock foundation and will stand the test of time and endurance." The rock foundation has held and withstood the tests of time, but the structure of the American Physiotherapy Association still is being built today and needs the aid and support of every member.

The tentative schedule of the 1941 convention is as follows:

Sunday—3:00 p.m. Registration
5:00 to 7:00—Supper
7:30 to 9:30—Business Meeting
Monday through Thursday
a.m. 8:30-10:00—Muscle Testing
10:10-11:40—Therapeutic Gymnastics
Muscle in Relation to Physical Therapy
12:00 to 1:00—Lunch
p.m. 1:00-1:50—Psychology for Invalid and Handicapped
2:00-3:30—Electrotherapy
3:40 to 5:15—Problems of Physical Therapy Schools
Problems of Crippled Children's Schools (on alternate days)
Friday a.m.—Business meeting
Speakers

Georgia Chapter

The January meeting of the Georgia Chapter was held at Warm Springs Foundation. After dinner Miss Alice Lou Plastridge gave an interesting account of her recent trip to observe work in physical therapy in Chicago, Milwaukee and Minneapolis. Visitors from Atlanta and Columbus were present.

At the February meeting in Atlanta, Georgia, following a dinner at the Georgian Terrace Hotel, Dr. Lawson Thornton extended an invitation to us to visit his office where he discussed and illustrated with pictures and X-rays his treatment of the repair of fractured hips.

Illinois Chapter

Miss Anne Prochazka has been granted a scholarship by the National Organization for Public Health Nursing and will spend the com-

ing year at Western Reserve University in Cleveland, Ohio.

During the winter quarter, the Illinois Chapter held a series of five conferences on "Muscle Grading."

Iowa and Missouri Chapters

We are pleased to announce the formation of the Iowa and Missouri Chapters of the American Physiotherapy Association. The officers are now listed in our chapter directory.

A two weeks' review course on "Physical Therapy and Orthopedic Conditions" was held at the Children's Hospital School, Baltimore, Maryland, from February 3 to 15, 1941. Since 1936 such a course has been given annually for the physical therapists employed by the Maryland State Department of Health, but this year, because of numerous requests, the course was opened to out-of-state physical therapists also.

Oregon Chapter

Miss Evea Applegate, twin sister of Eva Applegate, died on January 1, 1941, at the Eugene Hospital.

Pennsylvania Physiotherapy Association, Inc.

On Thursday, April 17, 1941, the Pennsylvania Physiotherapy Association, Inc., will hold its annual state convention at the Bellevue Stratford Hotel in Philadelphia. This is their third convention to be held with the Hospital Association of Pennsylvania, and all members of the American Physiotherapy Association are cordially invited to attend this meeting. Their program is as follows:

10:00 A. M.—Opening Session—S. Paul Campbell, President, Presiding.

Address of Welcome—Roger A. Greene, President, Hospital Association of Pennsylvania, Pottsville Hospital, Pottsville, Penna.

"Electroshock Therapy" — Donald Hastings, M. D., Clinical Director, Dept. Mental and Nervous Diseases, Pennsylvania Hospital, Philadelphia.

"The Importance of Technic in the Use of Electrotherapy"—Helen L. Kaiser, Mt. Sinai Hospital, Cleveland, O.

"Cerebral Palsy"—Helen Fidler Kenney.

11:30 A. M.—Business meeting—for members only.

12:30—Luncheon.

2:00 P. M. — Second Session — S. Paul Campbell, President, Presiding.

"Program for the Philadelphia Health Department"—Hubley R. Owen, M. D., Director, Department of Public Health, Philadelphia.

"The Use of Physical Therapy Measures in Neurological Conditions"—Bernard J. Alpers, M. D., Professor of Neurology, Jefferson Medical Hospital College, Philadelphia.

"Socialized Physical Therapy"—Francis F. Borzell, M. D. President, Medical Society of the State of Pennsylvania; Frankford Hospital, Philadelphia.

"Orthopedic Surgery and Physical Therapy"—John Royal Moore, M. D., Professor of Orthopedics, Temple University College, Philadelphia.

7:00 P. M.—Formal Banquet, Ball Room, Bellevue Stratford Hotel.

Asilomar

February 1st, several members of our Executive Board met at Asilomar for the semi-annual executive committee meeting to transact Association business and to get things lined up for the conference. Miss Irvine was the additional member of the Board, and Miss Furscott, Relations Chairman, was there to discuss the Relations program.

Perhaps you would like to have been a "bird on the wing" or a "mouse in the corner" and heard much of the conversation that went on there. Here is that chance:

P. I. "Let's not work—it's too grand to go indoors right now."

C. W. "How about doing the shops in Carmel? Do we vote to stay up late tonight instead of doing our chores now?"

Cath. "There's going to be a grand sunset. We can see it from the shore road."

And the evening brings the beauty of the sun sinking into the Pacific and the glory of the afterglow; the whispering of the breeze in the pines, the glow of the bonfire on the beach, or the quiet chat around the big fireplace in each guest house.

D. Y. "Could we have a sunset ride to Point Lobos and a picnic lunch some conference day?"

B. R. "A big bonfire and a picnic right at Asilomar's shores is just as good and not so much trouble."

* * *

E. C. "This Spanish and Mexican stuff here in the shops is so different from what we saw back East."

Cath. "And such lovely Hummels, too—and cheap—only $15.00!"

E. A. "Hummels? Hummels? Know what a Hummel is?"

P. I. "Better get home to dinner so we can

find out how the food is going to be for the conference."

E. A. "See those pines black against the sunset and the sand like snow in the dunes."

* * *

H. F. "My stars! Do hope they keep that cook for the summer."

D. Y. "Ought to—he has been here for four and a half years now."

B. R. "I'm too full to work."

C. W. "We'll walk around and see the place first. It will shake down the dinner."

* * *

H. F. "So we'll have one end of the dining cottage fenced off for us and that will be like dormitory times again. Candles and fireplace on the edge of a continent in mid-July. What a combination!"

E. C. "Isn't this a beautiful auditorium? Acoustics seem fine. No loud speaker set needed. And the speaker won't get away from the microphone all the time."

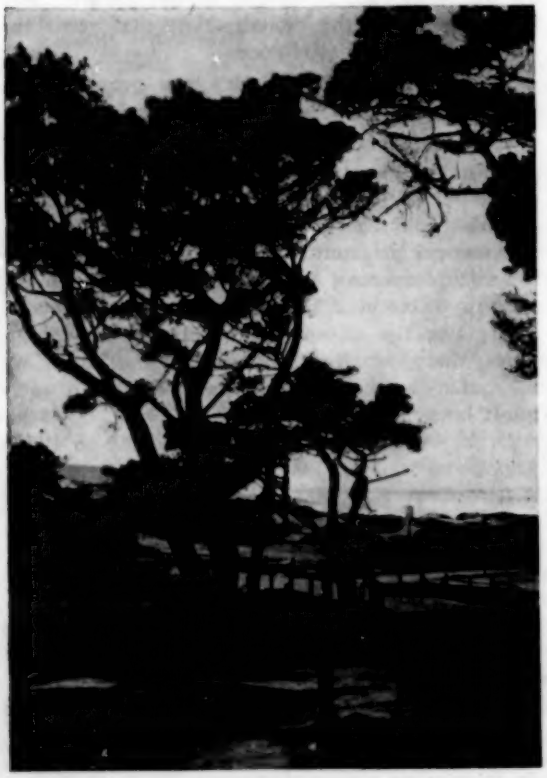

Fig. 1. Looking through the pine trees over the dunes to the blue Pacific.

Cath. "And the classroom building has good chairs with arms for note taking."

D. Y. "Let's not take any—have a stenographer and buy mimeographed copies of the whole thing."

P. I. "Everyone will enjoy this set-up, that is sure."

C. W. "Yes, it's a very different kind of convention, but we have gotten so big and our problems are changing so that we need idea-exchanging discussion groups to bring them out."

B. R. "The program of the Conference speaks for itself, but Asilomar must be experienced before it can speak to you. To me it is the perfect conference setting."

E. A. "Say, will the therapeutic gymnastics be given on the tennis court or in the swimming pool?"

B. R. "Look, there are bicycles, too. Yes, and horses handy—fine riding horses."

H. F. "Have you ever galloped on hard, wet, snow-white sand at the edge of the ocean with the breakers rolling? That is riding at Asilomar. And the beauty of it is that you don't have to bring any extra clothes—just the jeans or slacks that you are wearing anyway. Cowboy boots are nice if you have them, but oxfords are just as good if you haven't."

D. Y. "And you can even get golf clubs and balls and tennis rackets if you forget your own."

C. W. "We'd better work now. Tomorrow we'll look at the rooms."

* * *

And came the next day with the sunlight filtering through the trees; the long stretches of white sand with green breakers rolling in, spraying white foam at your feet; the gnarled and wind-swept pines telling of fierce winter gales. Perchance all this is blotted out and there is only the boom of the fog-horn and distant pound of the surf. Now any breakfast you want—put together what you will. Reduce on orange juice? No, we eat—eggs, pancakes—what have you.

P. I. "What a wonderful waffle! Too bad one can't eat twice." * * *

C. W. "Now to see the accommodations. Hilltop is tops—living room, fireplace, as usual. The glassed-in corridor around the inner court makes all rooms outside ones. Twin beds—exceedingly good beds, too, and private bath."

D. Y. "Next is Scripps—same good beds, outside windows—some rooms with private bath; others, four people to a bath, but every room has its own water supply. Nice big closets."

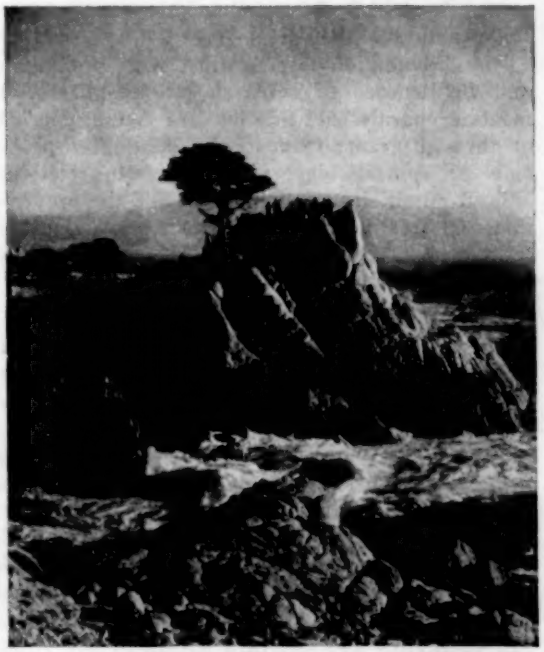

Fig. 2. Midway Point Cypress, most photographed tree in the world, on the 17 Mile Drive which adjoins Asilomar.

P. I. "These rustic wooden buildings scattered over sixty acres of pine trees and sand dunes, with the Pacific Ocean visible from practically every spot, makes a delightful place in which to be lazy or energetic depending on the individual."

H. F. "Hope the girls wear flat shoes in this sand. But the sand is so soft and white in those great drifts. I've had a nice sunning on that one over there—oh, yes, besides Scripps, there is the Lodge and Guest House."

E. A. "Here is fun—not room and bath, but cubicle and towel! Beds not bad, either. So, bed, towels and meals, for $15.75 for five days, and all the classrooms and out-of-doors you can hold are yours for the taking. The same with top rooms at $24.75."

Cath. "Oh, I hope people just love this place and have a perfectly swell time."

P. I. "We're going to have oodles of fun, for all work and no play makes anyone a dull person. I am more than pleased to find so many outdoor sports. Everything from shuffle board to horseback riding with side trips to Carmel and Monterey thrown in. I surely am completely sold on Asilomar for the conference."

B. R. "Because it isn't hot, sweaters and warm slacks or skirts even being in demand at times, physical and mental exercise is so much more enjoyable."

E. A. "And at least we know it won't rain, even with coolness."

Cath. "With the main assembly hall lined with our own exhibits and also used for the bigger conference gatherings and the other buildings with the large, airy rooms for smaller conference groups, I surely feel we can be accommodated much easier than in hotel rooms in the city—and in what large city could you find living accommodations ranging from $15.75 to $24.75 for the conference period—and what meals!"

* * *

And a note back from P. I. says: "I am still raving to my friends about Asilomar. In such a setting with the Pacific booming at your front door, sand dunes on either side and pine trees at your back door—what an ideal spot for a conference! I really have never seen more perfect accommodations for the type of convention we are planning this year."

A copy of the muscle charts and mimeographed suggestions for standardized procedure which were included in the article on "Muscle Group Testing" by Miss Signe Brunnstrom (January-February 1941, THE PHYSIOTHERAPY REVIEW) may be obtained by sending 15c to Miss Brunnstrom, 10 East 9th Street, New York City, or to the American Physiotherapy Association, Stanford University, California. These suggestions were prepared by Marjorie Dennen and Miss Brunnstrom for the "Round Table on Muscle Testing" which was held at the Annual Convention of the American Physiotherapy Association in June 1940.

Easter Seals

The National Society for Crippled Children will conduct its 8th Annual Seal Sale from March 21 to April 13, 1941. The income derived from the sale of these seals, as well as any contributions made, will be used to aid in the fight to prevent developmental or nutritional diseases which produce cripples; to aid in the earlier recognition of congenital defects, such as club foot or congenital dislocation of the hip, and also will help to promote the services necessary for the care of these crippled individuals.

Association of Western Hospitals

The 15th Annual Convention of the Association of Western Hospitals was held at the Fairmont Hotel, San Francisco, March 3, 4, 5 and 6, 1941. The program of the physical therapy section, arranged by Mrs. Mabel Fitzhugh, was as follows:

Tuesday, March 4, 1941 — 11:00 A.M. to 1:00 P.M.

Presiding, Mrs. Martha Palmer, chairman, physical therapy section.

"Methods by which the Physical Therapy Department Can Assist in Improving Service to the Patient" —Malcolm T. MacEachern, M. D., Associate Director, American College of Surgeons, Chicago.

Discussant—Mrs. Anna M. Elliott, Portland Clinic, Portland, Ore.

"Ways and Means by which the Hospital Administrator Can Prepare for Well-Trained Personnel in the Physical Therapy Department During a National Emergency"—Frederick Bost, M. D., San Francisco.

Discussant—Miss Catherine Worthingham, Director, Department of Corrective Physical Education for Women, Stanford University, California; President, American Physiotherapy Association.

ROUND TABLE DISCUSSION: "Cooperation of Administration, Nursing and Physical Therapy Departments"—Leader, Miss Evelyn Anderson, Stanford University Hospital.

"Intern Relationship to the Department of Physical Therapy"—Charles Fulmer, M. D., San Francisco.

Discussant—Lucile Eising, M. D., Children's Hospital, San Francisco.

"More Effective Cooperation Between the Department of Physical Therapy and the Department of Nursing"—Miss Sally Heitman, R. N., Children's Hospital, San Francisco.

Discussant—Mrs. Margery Wagner, University of California Hospital, San Francisco.

"More Effective Cooperation Between Administration, Nursing and Physical Therapy Departments" —Frances Baker, M. D., University of California Hospital, San Francisco.

Discussant—William Northway, M. D., Stanford University Hospital, San Francisco.

An exhibit of the work of the physical therapy department of a modern hospital is being prepared for the convention.

The National Foundation for Infantile Paralysis

The National Foundation for Infantile Paralysis held its first Annual Medical Meeting at the Waldorf-Astoria Hotel, New York City, on November 7 and 8, 1940. Attending the meeting were the members of the medical advisory committees, the grantees of the Foundation, and the Board of Trustees. Reports of the activities of committees and grantees for the preceding year were presented, and recommendations were made for grants for 1940-41.

The Foundation is concerned with promotion and furtherance of research on all phases of infantile paralysis. Studies are being carried on through grants from the Foundation on problems of epidemiology, virus research, relationship of nutrition to poliomyelitis, and the prevention and treatment of the disease. In addition, a program of professional and lay education has been promoted.

RESEARCH ON THE VIRUS

The Committee on Virus Research reported that studies were being conducted to determine the nature of the poliomyelitis virus. Paul F. Clark, Ph. D., University of Wisconsin, has concentrated the virus infected material obtained from spinal cords of monkeys so that infection may be produced in dilution of one part to ten million. Dr. Hubert S. Loring, Leland Stanford University, who has been studying the purified and concentrated virus, concluded that the virus is protein in nature, or contains protein material. The properties and chemical nature of the virus will continue to be studied.

Drs. John R. Paul and James D. Trask, Yale University School of Medicine, reported the finding of the poliomyelitis virus in stools of patients, contacts and in sewage collected from epidemic areas. Dr. S. D. Kramer, Michigan Department of Health Laboratories, reported the occurrence of healthy carriers in an institutional outbreak in Detroit. Karl F. Meyer, Ph. D., and Beatrice Howitt, The George Williams Hooper Foundation of the University of California, conducted detailed laboratory studies of material collected from patients, contacts and the environment during an epidemic in Tacoma, Washington.

Reports were made of the efforts to produce infection with poliomyelitis viruses in animals other than the monkey. This confirmed the previously reported findings of Armstrong to the effect that the Lansing strain could be made to produce infection in various cotton rats. All investigators, excepting Dr. John A. Toomey of the Western Reserve University School of Medicine, reported that only this one strain could be made to produce disease in the cotton rat. Toomey, however, had success in growing, by a special technic, several other old as well as newly isolated strains in the cotton rat. This observation may be of the utmost importance in conducting further clinical and epidemiological studies.

The distribution of the virus in the body was reported by Drs. R. D. Lillie, National Institute of Health in Washington, Albert B. Sabin, University of Cincinnati, John F. Kessel, University of Southern California, and others. All showed that the virus could be routinely recovered from central nervous tissue of human fatal cases and from experimental animals, and that excepting for tonsils, adenoids and lymph gland tissue, no other part of the body was shown to harbor the infection.

STUDIES OF IMMUNITY

Studies on the development of active and passive immunities were reported. *All attempts at producing immunity have thus far met with failure.* Dr. Kessel reported that one infection did not routinely protect monkeys from subsequent disease on reinoculation. He also made the observation that there was but little relationship between the presence of neutralizing antibodies in the blood stream and immunity to the disease.

CHEMOTHERAPY

Studies in chemotherapy were reported by C. C. Young, Ph. D., and Dr. S. D. Kramer of the Michigan Department of Health Laboratories. While they have not found a chemical that will do for poliomyelitis what sulfanilamide has done for certain bacterial infections, leads have been discovered which are now the subject of further investigation.

INVESTIGATIONS OF AFTER-EFFECTS

Reports were received from grantees who are studying both the effects of the disease and the methods of prevention of damage. Dr. Donald Young Solandt, University of Toronto, concluded that the muscular fibrillation resulting from nerve destruction is not the primary cause of atrophy of paralyzed muscle. Dr. Clinton N. Woolsey, Johns Hopkins University School of Medicine, concurred in these results, but Dr. Samuel Soskin, Michael Reese Hospital in Chicago, felt that in the animals which he studied fibrillation did play an important part in the degree of atrophy resulting from nerve destruction.

Physiological changes in muscular atrophy are being studied by Dr. I. Arthur Mirsky at the Jewish Hospital in Cincinnati, by Dr. A. T. Milhorat at the Russell Sage Institute for pathology in New York and by Professor Harry M. Hines at the State University of Iowa. None of these has pursued the investigations far enough to warrant any definite conclusions.

Gross and microscopic pathological studies of paralyzed muscles carried on by Dr. Herbert E. Hipps, Crippled Children Hospital in Marlin, Texas, showed that occasionally muscles developed a band-like form of degeneration, and that when mattress sutures were used to connect the muscle above and below these bands, good functional results were obtained.

Several instruments were presented for the more accurate testing of muscle strengths. Dr. A. A. Schmier, Hospital for Joint Diseases in New York City, developed a muscle tester and recording apparatus suitable for measuring in pounds and ounces the pulling power of most of the muscles of the body. Dr. Leo Mayer of the same hospital has developed a table designed to evaluate in the same terms the muscle power of the trunk.

SURGICAL TREATMENT

Several studies have been completed and others are still being conducted that measure the end results of various forms of surgical and conservative treatment. Drs. George E. Bennett and Raymond E. Lenhard, Children's Hospital School in Baltimore, concluded that if the maximum benefits of physical therapy are to be secured patients must be under such care within six months of the onset. They further showed that 97 per cent of all weakened or paralyzed muscles regain the maximum possible strength within eighteen months after onset of treatment. Dr. William B. Carrell, Texas Scottish Rite Hospital in Dallas, confirmed these observations. In addition, he concluded that rest with physical therapy in the hospital had no advantage over similar treatments given in the home. Hospital care over long periods was of decided advantage only when underwater treatments were used.

Doctor Carrell also pointed out the disadvantages of plaster casts continued over periods of from four to six months, even when the patients reported for frequent reapplications of the casts.

The value of rest treatment was further emphasized by laboratory studies on infected monkeys. Dr. Sidney O. Levinson, Michael Reese Hospital in Chicago, showed that monkeys forced to exercise during the active disease process had not only a greater amount of paralysis but also a higher death rate.

Much work has been done on study of bony deformity, such as scoliosis and unequal leg lengths, resulting from infantile paralysis. Since years of observation of individual patients are

necessary, only progress reports could be made at this meeting.

EPIDEMIOLOGY

Reports were rendered on the activities of the Foundation in epidemic areas. It is not the purpose of the Foundation to provide medical care to patients, yet it has rendered certain assistance to communities and hospitals by supplying splints, Bradford frames, and by making respirators available. Studies of epidemics were made in a few areas upon the request of and with the consent of the health officers. These studies have progressed only far enough to point the way for more elaborate and exhaustive work in the future.

EDUCATIONAL ACTIVITIES

To inform both professional workers and the public of certain aspects of this disease an educational program has been conducted. An exhibit at the New York World's Fair was viewed by over five million persons. Scholarships have been made available through the National Research Council to physicians wishing to specialize in orthopedic surgery or virology. Other scholarships have been made available to nurses wishing to specialize in the orthepedic aspects of public health nursing. Graduate instruction in physical therapy also has been provided.

Booklets have been prepared and widely distributed dealing with the use of the respirator, the nursing care of poliomyelitis patients and other phases of the problem.

Scientific investigation of the possible relationships existing between the state of nutrition and the development of infantile paralysis has been undertaken. It was not deemed expedient to limit these studies to poliomyelitis, but rather to include the entire field of infectious diseases.

At this meeting additional grants were recommended for continuation of existing studies or new investigations in the amount of $137,350.00.

As the result of elections, the following chairmen of medical committees were appointed:

The Committee on Virus Research—Thomas M. Rivers, M. D., Director, Hospital of the Rockefeller Institute for Medical Research, New York City.

The Committee on Research for the Prevention and Treatment of After-Effects—Philip Lewin, M. D., Associate Professor, Orthopedic Surgery, Northwestern University Medical School, Chicago, Illinois.

The Committee on Nutritional Research—James S. McLester, M. D., Professor of Medicine, University of Alabama School of Medicine, Birmingham, Alabama.

The Committee on Epidemics and Public Health—Herman M. Bundesen, M. D., Commissioner of Health, Chicago, Illinois

The Committee on Education—Max M. Peet, M. D., Professor of Surgery, University of Michigan Medical School, Ann Arbor, Michigan.

The Committee of Medical Publications—Morris Fishbein, M. D., Editor, Journal of the American Medical Association, Chicago, Illinois.

Index to Current Literature

Apparatus

Two Simple Devices for Stretching the Tendo-Achilles with Reference to their Use in the Treatment of Flatfoot. F. H. KRUSEN, M. D. and J. H. CHERRY, M.D. Proc. Staff Meetings, Mayo Clinic, July 1940.

An Improved Apparatus for Convulsive Therapy. LOUIS FELDMAN, M.D. and FREDERICK T. DAVIS. Arch. P. T., Feb. 1941.

A Universal Splint for Emergency Immobilization of Fractures of the Extremities, Neck and Back. ALEXANDER L. BASSIN, M.D. J. Bone and J. Surg., Jan. 1941.

A Simple Corrective Device for Hallux Valgus. MARTIN BATTS, JR., M.D. J. Bone and J. Surg., Jan. 1941.

A Model Rehabilitation Centre. J. Chart. Soc. M. and M. Gym., Jan. 1941.

Equipment for the Cerebral Palsy Child. ELEANOR H. FARRELL. Pub. Health Nurs., Jan. 1941.

Arthritis and Rheumatism

The Role of the Masseuse in the Treatment of Rheumatic Diseases. OSWALD SAVAGE. J. Chart. Soc. M. and M. Gym., Dec. 1940.

Prophylactic Use of Sulfanilamide in Patients Susceptible to Rheumatic Fever. CAROLINE BEDELL THOMAS, M.D.; RICHARD FRANCE, M.D., and FRANJO REICHSMAN, M.D. J. A. M. A., Feb. 15, 1941.

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Diagnosis and Treatment of Bronchial Asthma. CHARLES H. EYERMANN, M.D. Dis. of the Chest, Aug. 1940.

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The Pathological Anatomy of Spondylolisthesis. HAROLD ALTMAN, M.D. Bull. Hosp. Joint Dis., Jan. 1941.

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MOORE WHITE. J. Chart. Soc. M. and M. Gym., Dec. 1940.

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Coracoclavicular Articulations. P. DAVID NUTTER, M.D. J. Bone and J. Surg.. Jan. 1941.

Injuries to the Knee Joint. K. H. PRIDIE. J. Chart. Soc. M. and M. Gym., Jan. 1941.

Lesions About the Shoulder Joint. A. STEINDLER, M.D. Northwest Med., Jan. 1941.

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Occupational Therapy in Heart Disease. PAUL D. WHITE, M.D. Occup. Ther. and Rehabil., Feb. 1941.

Effects of Intravenous Solutions on Patients With and Without Cardiovascular Defects. F. D. MURPHY, M.D.; HOWARD CORRELL, M.D., and J. C. GRILL, M.D. J. A. M. A., Jan. 11, 1941.

Chronic Heart Diseases: Diagnosis and Treatment. CLARENCE E. DE LA CHAPELLE, M.D. New York State J. Med., Nov. 15, 1940.

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Present Status of Short Wave Diathermy in Nasal Sinusitis. A. R. HOLLENDER, M.D. Arch. P. T., Jan. 1941.

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Surgical Approach to the Proximal End of the Radius and Its Use in Fractures of the Head and Neck of the Radius. EMANUEL B. KAPLAN, M.D. J. Bone and J. Surg.. Jan. 1941.

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Injuries

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The Role of the Masseuse in the Treatment of Rheumatic Diseases. OSWALD SAVAGE. J. Chart. Soc. M. and M. Gym., Jan. 1941.

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Resuscitation of the Asphyxiated Newborn Infant. J. D. RUSS, M.D., and ROBERT A. STRONG, M.D. Amer. J. Dis. Child., Jan. 1941.

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Some Orthopedic Relationships of Neurofibromatosis. BEVERIDGE H. MOORE, M.D. J. Bone and J. Surg., Jan. 1941.

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The Antigenic Potency of Epidemic Influenza Virus Following Inactivation by Ultraviolet Radiation. JONAS E. SALK, M.D.; G. I. LAVIN, Ph. D., and THOMAS FRANCIS, JR., M.D. J. Exper. Med., Dec. 1, 1940.

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ABSTRACTS

John S. Coulter, M.D.

Studies on the Relief of Pain by Counterirritation

George D. Gammon and Isaac Starr. In J. Clinical Invest., 20:1:13, January 1941.

Counterirritation always has been one of the most important methods available to physicians for the relief of pain, yet it is poorly understood and in recent years has claimed scant attention. Our purpose was to experience, study and analyze the phenomena of counterirritation in the hope of obtaining information which would lead to the improvement of the clinical methods now in use.

The extreme difficulty of evaluating a patient's statements regarding the discomfort from which he is suffering need not be emphasized.

In seeking an explanation for the differing effects of counterirritation upon pain from salt and from capsicum, it is necessary to consider the differences in origin of the pains.

Since the capsolin-activated skin endings are quite superficial, their temperature can be rapidly altered by surface applications, and it is not surprising, therefore, that the capsolin pain is easily affected by local temperature shifts.

On the other hand surface applications could not readily alter the temperature of the deeperlying nerves which are stimulated by subcutaneous NaCl. Consequently, it would be unlikely that sensation would fluctuate in direct relation to surface temperature. We, indeed, found no correlation between pain and skin temperature. Both heat and cold temporarily decrease NaCl pain. We must, therefore, look for some explanation other than an altered peripheral sensory discharge secondary to temperature change to account for these shifts in sensation in the case of NaCl pain.

We are thus led to consider the possibility that counterirritation may act by altering some central mechanism. Such a theory is not new; Cushny suggested, on the basis of Head and McKenzie's data, that counterirritants act centrally. Several of our observations strengthen this possibility. Thus, while it is well known that the most effective site of counterirritation is over the painful area, nevertheless counterirritation applied elsewhere is by no means ineffectual. Furthermore, we also found the typical pattern of relief on application and removal of the counterirritant, whether it was applied over the painful area or at some distant site unrelated in peripheral nerve supply.

A possible basis for a central sensory depression or inhibition is provided in recent experiments of Bronk. When a nerve cell which is stimulated chemically has its activity increased for a short time by electrical stimulation, there follows a period of diminished irritability during which the cell responds to the same chemical stimulus, either at a lower frequency or not at all.

To summarize: We can account for the effect of cold in relieving capsolin pain on the basis of a decreased peripheral sensory discharge due to lowering the temperature of pain endings. Our evidence suggests a central, poststimulatory depression of the type described by Bronk for peripheral structures to explain the relief of pain on stopping counterirritation. The temporary relief of pain, which immediately follows the application of the counterirritant, also is due to a depression of sensation by alteration of some central mechanism, for a similar temporary relief occurs when the counterirritant is applied to remote areas, as well as over the painful site. This inhibition of sensation suggests an analogy to motor inhibition, a subject which has been discussed recently by Gasser and Eccles. On the sensory cortex Bard has observed a masking effect of one tactile stimulation upon a second. In the present state of our knowledge we can only call attention to these possible relationships; none of them provides a complete analogy or explanation of our findings.

Although we concluded that the effects of altered circulation are not responsible for the effects of counterirritation which we have observed, it is of interest to note that the alterations both in sensory discharge and in sensation which followed circulatory obstruction run parallel to the changes in nerve irritability under oxygen lack. Nerves deprived of oxygen or human nerves with the circulation cut off by an inflated cuff first become more irritable to stimulation, then gradually less so. Restoring oxygen or blood brings about a temporary but large decrease in irritability.

Arthritis and Allied Conditions, with Particular Reference to Their Treatment

Boyce W. Harris, M. D. In Med. Bull. Veterans' Admin., 17:3:247, January 1941.

Fever treatments are not given as such, but it is possible to get fairly high temperature of the body by means of cabinet baths, which are used extensively at Jefferson Barracks. Baking, massage and exercise are given more or less routinely to a large group of arthritic patients in our physical therapy department. Heliotherapy also is used whenever possible, sometimes as sun rays, but more frequently as ultraviolet rays from lamps.

Alert, competent, interested personnel, to administer the physical therapy prescribed by the physician, contribute most to successful results in the treatment of these patients.

As occupational therapy, we have found especially beneficial the operation of a loom, sewing machine or stationary bicycle, the weaving of baskets or work with manual training tools, such as are found in a carpenter or machine shop. The use of the typewriter also is valuable in restoring function to stiff and inelastic joints of fingers resulting from an arthritic process or some other closely allied condition.

Medical Application of Ultraviolet Radiant Energy

Frank H. Krusen, M. D. In Annals Int. Med., 14:4:641, October 1940.

Diseases of the Alimentary Tract.—Ultraviolet irradiation is one of the most important factors in the arrest and treatment of intestinal tuberculosis. In the treatment of tuberculosis peritonitis the best results are obtained in the ascitic type. In abdominal tuberculous adenitis it may be unwise to temporize with light therapy, since it has been reported that in more than three-fourths of the cases it is possible to exise the affected glands.

Diseases of the Circulatory System.—There is considerable similarity between anemia and rickets. Ultraviolet irradiation may be beneficial in the treatment of either disease.

In a study conducted for a period of more than eight years in an artificial light clinic for school children it was found that, in anemic children, after 12 or more exposures to irradiation from a carbon arc lamp the amount of hemoglobin increased by approximately 10 per cent. Another controlled study of the use of ultraviolet irradiation in 54 cases of secondary anemia showed greater increases in hemoglobin and in the number of erythrocytes and leukocytes in the treated than in the control group.

Diseases of the Respiratory System.—Further investigations will be necssary before final conclusions can be drawn concerning the value of ultraviolet irradiation in treating common colds.

In the treatment of pulmonary tuberculosis there has likewise been much controversy concerning the use of ultraviolet irradiation. Although ultraviolet light frequently is used in Europe for the treatment of pulmonary tuberculosis, in this country it often has been thought to be dangerous. It has been especially stressed that there is danger of producing pulmonary hemorrhage. My own controlled studies on 60 patients who were receiving routine sanatorium care indicated that hemoptysis did not contraindicate the judicious employment of heliotherapy, and a number of other investigators have reached similar conclusions following controlled studies. It has been said that treatment which brings about improvement in the general health of the patient is the best means of combating pulmonary, as well as surgical, tuberculosis.

Observations on 115 patients treated by carbon arc irradiation led to the conclusion that patients with minimal, moderately advanced and even far advanced pulmonary tuberculosis may be benefited by graduated exposures provided the patient's temperature does not rise above 37.5 C. (99.5 F.) and his general physical condition is satisfactory.

In Denmark light treatment of pulmonary tuberculosis is now almost universal, and in Britain detailed results in a series of 123 cases led to the conclusion that, provided patients are carefully selected, chronic pulmonary tuberculosis may be treated not only with safety but with good results.

Recently a number of writers in the United States have expressed a similar opinion. It has been reported that clinical experience will convince one of the value of the mercury-quartz-vapor lamp in the treatment of pulmonary tuberculosis in children. Tuberculosis infants who show excessive pulmonary infiltration even with cavity formation may recover.

Diseases of the Bones and Joints.—An extensive study on the nonoperative treatment of tuberculosis joints of the lower extremities revealed that, over a period of years, 65 per cent of the adult patients under treatment for all extrapulmonary tuberculous lesions showed a definite, though usually inactive, pulmonary tuberculosis. Conservative treatment by heliotherapy, in conjunction with routine care, was the method used in this large series of cases. It was concluded that such conservative treatment usually resulted in healing with useful motion. Operative interference should not be attempted until after prolonged heliotherapy has been tried.

In osteomalacia, fragilitas osseum and delayed union of fractures, all of which may be due to faulty calcium metabolism, ultraviolet irradiation may be of value. In a study of experimental fractures of the fibula in 25 normal dogs and 80 normal rats, measured amounts of carbon arc radiation were administered during the period of healing. In fractures of the long bones it has been reported that among patients who were given irradiated ergosterol there was an increase in the density and the amount of callus as compared with a control group of patients. These changes were greatest in children and in the aged, and they began to appear about three weeks following injury.

A number of authors have recommended the use of ultraviolet radiation both for atrophic and hypertrophic arthritis. Although there is no specific effect it is believed by many clinicians that ultraviolet irradiation is of value, particularly when there is an associated secondary anemia or when the patient has been confined to bed for a long period.

It has been recommended that, in cases of chronic infectious arthritis in children, reasonable exposure to sunlight or quartz lights be utilized during the winter months. Ultraviolet irradiation has been specially recommended in the treatment of psoriatic arthritis. A combination of crude, cold tar ointment and ultraviolet irradiations is applied to the psoriatic lesions, and heat, massage and exercise are applied locally to the involved joints.

Diseases of the Genito-urinary System.—It has been reported that in a series of 26 cases following nephrectomy for renal tuberculosis ultraviolet irradiation proved to be a most helpful therapeutic measure for the cure of the tuberculous sinuses and visceral ulceration incident to the disease.

Diseases of the Eye.—Following an 18-year study, ultraviolet irradiation was reported to have proved its worth in the treatment of diseases of the eye. Such treatments, for example, had reduced the proportion of losses in ulcus serpens from 30 to 6 per cent; ultraviolet irradiations had likewise produced favorable results in other diseases of the cornea, conjunctiva and sclera.

Diseases of the Nose.—Ultraviolet irradiation has been recommended as an adjunct to the surgical removal of tuberculous lesions of the nose. It has likewise been said that ultraviolet irradiation is of value in the treatment of infected wounds and certain nasal dermatoses, and its use has been suggested for ulcerations of the nose, especially septal ulcers.

Diseases of the Throat.—Combined general and local ultraviolet irradiation has been recommended in the treatment of tuberculous laryngitis.

Strandberg reported a series of 203 cases of tuberculous laryngitis in which the patients were treated by general ultraviolet irradiation followed by cauterization. One hundred and thirteen patients were reported as cured of the disease of the larynx, and the majority of the others were said to have improved.

Miscellaneous Diseases.—In rickets it is believed that ultraviolet irradiation furthers the absorption from the intestine of either phosphorus or calcium, or both. It is probable that the hydrogen-ion concentration is the limiting factor in such action. It has been shown by a number of investigators that, to produce beneficial effects in the treatment of rickets, it is necessary to administer only comparatively small doses of effective ultraviolet radiation. For example, a single weekly exposure to one erythema dose of ultraviolet rays was sufficient to produce healing of rachitic lesions in infants. Irradiations with a mercury quartz lamp, front and back, for four or five minutes once weekly until approximately 100 minutes of exposure had been given, was sufficient to effect cure in a series of 43 rachitic nurslings.

Results comparable to those obtained in the treatment of rickets also may be obtained by the use of ultraviolet irradiation in cases of tetany and spasmophilia.

Burns

H. Atkins, Esq., M. S. In Guy's Hospital Gazette, LIV: 1364:320, November 2, 1940.

The Treatment of the Local Condition

First Degree Burns.—First degree burns are rarely very serious. The treatment consists in the application of sodium bicarbonate solution or hypertonic saline which will prevent vesication.

Second Degree Burns.—A general anesthetic is required. The burnt surface should be gently but firmly swabbed with sponges soaked in saline. All dead skin should be removed, including that which covers the blister and the surrounding area. The most scrupulous asepsis should be observed, and any area which is not being operated upon should be covered by warm sterile towels to control loss of heat from the body surface. In scalds there sometimes are hairs growing undamaged from the denuded surface and these can be shaved without damage to the underlying dermis. The area is then swabbed with 1 per cent gentian violet and when this is dry (a process which can be accelerated by means of an electric hair dryer), the area is swabbed with 10 per cent tannic acid, followed by 10 per cent silver nitrate, and the hair dryer is again employed to dry up the coagulum; this method produces immediately a firm, stable crust.

Third Degree Burns.—A third degree burn affects the true dermis or deeper structures. Burns which are diagnosed as third degree burns when first seen should be treated by the application of saline compresses or, if they are of very great extent, by immersion of the patient in a bath of normal saline for three or four hours each day. The patients derive enormous benefit from this method, and it is very difficult to persuade them to leave the bath as in it their pains are completely eased. When they come out of the bath the raw area should be dried under an electric cradle. There is not then the same tendency to "drawing" pains which follow the drying of these areas at lower temperatures. If the special apparatus is not available a satisfactory saline bath can be made by adding 1 gallon of saturated salt solution to 32 gallons of water.

Rheumatoid Arthritis: Etiology and Treatment

Russell L. Haden, M. D. In Arch. P. T., 21:11:671, November 1940.

The first and most important procedure in the management of rheumatoid arthritis is a thorough history, a complete physical examination and a detailed laboratory study. The special examination should include:

1. The sedimentation rate.
2. A test meal.
3. A roentgenogram of a typical joint and of the teeth and sinuses.
4. Careful examination of the blood for anemia.
5. The basal metabolic rate.
6. Blood uric acid.
7. Glucose tolerance curve.
8. Sometimes, roentgenographic study of the gastro-intestinal tract.

Rest.—This is the most important element in treatment. One should no more think of ideally treating rheumatoid arthritis without rest in bed than one would active tuberculosis. Often this is impossible. The next best thing is to regulate activity to provide for as much rest as possible.

Diet.—There is no specific diet for rheumatoid arthritis. The glucose tolerance curve frequently shows a disturbance in carbohydrate utilization and carbohydrates often have been taken in excess. The diet frequently has been defective in protective foods and proteins.

Treatment of Anemia.—Almost every patient with active rheumatoid arthritis has some degree of anemia, usually a hypochromic anemia from an iron deficiency.

Transfusion is of the greatest value, both from a general standpoint and to combat the anemia.

Removal of Focal Infection.—It seems more and more evident to critical observers that focal infection is concerned only as an influencing factor in rheumatoid arthritis and is not the point at which a specific organism causing the arthritis is harbored. The main problem is to decide when sources of infection should be removed. This should be done early in mild cases.

Drug Therapy.—The value of drugs in rheumatoid arthritis other than to relieve pain may be questioned.

Specific and Nonspecific Vaccines.—If the view is accepted that the cause of the disease is unknown, it is apparent that there is no "specific" vaccine.

Patients often are helped by nonspecific vaccines. For this, the stock typhoid-paratyphoid vaccine is excellent.

Artificial Fever Therapy.—This has not been of much value in rheumatoid arthritis in our hands. Hench has summarized the entire national experience on the basis of published reports. Of about 200 patients treated with artificial fever therapy, less than 10 per cent became symptom-free and about 25 to 30 per cent noted some relief. Early relapse is common after fever treatment. This method of therapy also should not be employed in seriously ill patients.

Physical therapy has a large place in the treatment of rheumatoid arthritis. It consists of tonic measures such as ultraviolet radiation, measures to improve the general and local circulation, and those to prevent or overcome the deformities incident to the disease. The simplest way to get ultraviolet radiation is by direct exposure to the sun, and this is the treatment of choice when the climate and season permit. It is, of course, of value only when the nude body is exposed to the sun. Various heating devices such as cabinet baths, paraffin baths, diathermy and radiant heat, especially when combined with massage and manipulation, are of great help. Many simple home-made devices are just as valuable as the expensive apparatus. A home baker can be made with a frame and light bulbs, and a paraffin bath with an inexpensive electric hot plate and a double boiler. In addition to the measures outlined, postural and breathing exercises to improve the thoracic and abdominal muscles are of much value. These can be carried out without apparatus or other expense.

Orthopedic Aid.—Every patient with rheumatoid arthritis should be under orthopedic supervision early in order to prevent contractures.

Painful Shoulder: Diagnosis and Treatment

Louis Kaplan, M. D. In Penna. Med. J., 44:3:289, December 1940.

A. Acute Traumatic Lesions.

1. Acute subacromial bursitis.

Injury to the bursal surfaces is important because of its sequelae. If the arm is held at the side for a sufficient length of time, dense adhesions form between the apposed surfaces and limit humeroscapular motion.

It is, therefore, of the utmost importance to begin motion at the shoulder as soon as the acute symptoms subside. The stooping exercises make use of gravity and permit a wide range of motion with very little muscular exertion and pain.

2. Acute traumatic myositis and tendinitis.

Neglect of early exercise, protracted use of a sling and dependence on diathermy machines lead to muscular contractures and persistent fibrositis and are the causes of prolonged disability.

3. Rupture of visible muscles about the shoulder.

Operation should be performed.

4. Dislocation of the tendon of the long head of the biceps.

Operative technic.

5. Rupture of the insertion of the short rotators, mainly the supraspinatus.

Conservative treatment is useless. There is no harm in giving conservative treatment (abduction splint, rest, ice bags for 24 to 48 hours) for a week or so until the acute symptoms subside.

B. Late Posttraumatic Lesions.

1. Subacromial bursitis with adhesions.

When the symptoms are mild and motion is only moderately restricted, stooping exercises and wall-climbing exercises for 5 minutes, 3 to 5 times daily, followed by a brisk rub with liniment or methyl salicylate ointment, are prescribed. The patient is advised to use the arm as much as possible and to sleep with the arm above the head.

When the condition is advanced, with marked restriction of motion and severe pain, the adhesions must be separated by manipulation under local or general anesthesia. The patient is given opiates and salicylates after manipulation and is required to begin stooping exercises and wall-climbing exercises within 24 hours even though they cause great pain.

2. Scalenus syndrome (brachial plexus irritation by scalenus spasm).

Improvement of posture and corrective exercises are helpful. Repeated injections of procaine solution into the muscle are of considerable value and give prolonged and often quite lasting relief.

C. Shoulder Pain without a History of Acute Trauma.

1. Narrowing of the intervertebral voramina with radiculitis.

The treatment is orthopedic or neurosurgical.

2. Cervical rib.

3. Scalenus syndrome without a history of injury.

These conditions are characterized by pain in part of or in the whole brachial distribution. Cervical rib must be excluded only by roentgen-ray examination; when present, it requires operation. The scalenus syndrome without trauma is treated in the same manner as the posttraumatic syndrome previously described.

4. Subacromial bursitis with adhesions.

The treatment is similar to that described for posttraumatic bursal adhesions.

5. Calcareous tendinitis (peritendinitis calcarea).

a. Acute.

The most dramatic relief of symptoms may be obtained by introducing a large bore needle (16 or 18 gauge) into the deposit under local anesthesia. Injection of procaine and aspiration of the deposit give prompt relief.

b. Mild chronic.

These cases are best treated by a program of exercises. Heat and massage at home twice daily help to prevent stiffness.

6. Chronic bursitis without adhesions.

Treatment depends on the severity and persistence of symptoms. Active exercises and active use must be continued to prevent bursal adhesions. Heat and massage at home twice daily may be helpful. If the symptoms do not abate in a reasonable length of time (3 to 6 weeks), the bursa should be explored.

Postoperative Thrombosis and Embolism

Geza de Takats, M. D., F.A.C.S. In Illinois Med. J., January 1941.

Postoperative thrombosis and embolism continue to be one of the unexpected, dreaded and seemingly unavoidable complications of surgery. It is generally known that advanced age, obesity and operations requiring laparotomies raise the incidence of embolism.

Hemoconcentration not only occurs in dehydration due to vomiting, inability to take liquids by mouth or diarrhea but is typical of the delayed, secondary shock following operation or burns. The extent and duration of this may become an important factor in postoperative thrombosis.

A typical example of the effect of hemoconcentration on vascular clotting is seen in polycythemia. Here coagulation time is short and thrombosis frequently occurs both in the arterial and venous sides.

Slowing of venous return from the lower extremities and pelvis is measurably retarded after operations. Factors responsible for this are: (1) fall in arterial pressure, (2) decreased diaphragmatic excursions which greatly influence the emptying of the vena cava, (3) increased intra-abdominal pressure owing to distention and tight dressings, and (4) Fowlers position which creates a venous pool in the pelvis. Of course, the most potent stimulus for venous backflow is active muscular movement, and the patient should be encouraged to do this from the third day on until

he or she is ready to get up. In case of a suspected or manifest thrombosis the exercises are naturally stopped. There seems to be no reason, however, to discontinue the elevation of the foot of the bed.

The meterologic factor.—During the spring and fall periods, which showed marked barometric and thermal fluctuations, actually more emboli occurred and the summer months were comparatively exempt.

The objectives of the early treatment of postoperative thrombosis are to free the limb of the edema and to protect the patient as far as possible from propagating thrombosis and embolism. The footend of the bed is elevated six to eight inches on shockblocks. The limb is fomented from toes to groin with warm wet dressings. Heat cradles are dangerous as the edematous limb blisters very easily and may even lead to gangrene. If a heat cradle is used it is better to apply it to the groin and over the abdomen. Liquids are restricted to 1000 cubic centimeters for a few days and a salt poor diet is prescribed. Both of these measures help to prevent retention of fluid in the affected limb. While further dehydration may be accomplished with mercurial diuretics, it should be remembered that too much dehydration may result in hemoconcentration. Thus while edema is then diminished the tendency to ascending thrombosis is facilitated.

As long as the edema is marked and the patient is febrile, bedrest in the Trendelenburg position is maintained. Patients with saphenous phlebitis need not be immobilized for any length of time but may get up early with adequate elastic support. The phlebitis of deep veins, however, needs longer rest. It has been de Takat's procedure to keep the patient in bed for ten days after the evening pulse has returned to its level which is normal for the individual. Then the patient is allowed to sit up, hang his feet over the bed and perform a few flatfoot exercises for five minutes three times a day. This sometimes results in an elevation of temperature or pulse on the night of the exercise, which suggests further immobilization. However, if no reaction ensues, an Unna's glycerine-gelatin cast is applied from the toes to the groin, which is worn for three weeks and then reapplied for another three weeks.

The hard brawny induration folowing deep thrombophlebitis may be prevented to a great degree by the early measures discussed in the previous paragraph. Iontophoresis is a method whereby vasodilators or sodium chloride are introduced through the skin with a galvanic current. Smaller indurations do respond with softening after 20 to 30 treatments; however, permanent softening seldom can be accomplished. Removal of foci of infection helps to diminish the incidence of a patchy type of acute recurrent induration which leaves the patient with more and more edema and often leads to ulceration.

When a stage of recurrent ulcerations has been reached, the condition should be regarded as a major surgical problem.

Pulmonary Embolism

There is of course no pulmonary embolism without a preexisting thrombosis. In tabulating the factors responsible for the mobilization of the clot Jesser and de Takats have recently reported that in 30 per cent of their cases some definite immediate cause such as bowel movement, active or passive physical exertion, the milking action of a large enema, sitting up out of bed for the first time, and reverse gastro-intestinal peristalsis seem to have precipitated the embolus. In 70 out of 100 cases, however, no obvious precipitating factor could be found.

When cyanosis and dyspnea are the predominant symptoms, oxygen by nasal catheter, or preferably in 100 per cent concentration with the new B.L.B. mark, is logical.

Mutation Effects of Ultraviolet Light in Drosophila

K. Mackenzie and H. J. Muller, In Proc. Royal Society, 129:857:491, December 31, 1940.

It has now and again been claimed that carcinomas may be produced as a result, direct or indirect, of the action of ultraviolet light upon the epidermis, especially in forms with little skin pigmentation. It would be worthwhile to conduct a series of more exact investigations into this matter, determining how regular is the effect, if any, under given conditions of treatment, and whether the rays themselves actually penetrate to the cells in which the cancer arises. If it could be shown that the curve relating the frequency of the effect to the wave-length of the impinging radiation has its beginning and its maximum in the same regions as the curve for the absorption of ultraviolet light by nucleic acid and for the mutational effectiveness of ultraviolet, when due allowance for the amount of penetration of the different wave-lengths to the tissue in question has been made, then a strong prima facie case would be set up for the effect being a mutational one. And not only that, but the conclusion also would be favored that the mutations giving rise to these cancers were of the gene-mutational type rather than either structural changes in chromosomes or whole-chromosome changes.

Public Health Aspects of Rheumatic Heart Disease: Incidence and Measures for Control

Homer F. Swift, M. D. In J.A.M.A., 115:18: 1514-15, November 2, 1940.

Sanatorium Therapy of Rheumatic Heart Disease

While the nature of rheumatic fever and rheumatic heart disease and the size of the problem have long appeared to make it amenable to public health consideration, as far as can be learned, only in London have extensive provisions been made for the care of the majority of rheumatic children. In many of our cities the school authorities have provided facilities for education, transportation and schoolroom environment specially arranged for children with heart disease. Special cardiac outpatient departments, often supervised by local heart association specialists, attempt to furnish medical care for these children; and in a few cities there are good convalescent homes largely supported by private philanthropy, with private physicians in attendance. All of these efforts, however, apparently have only scratched the surface. It is fortunate, therefore, that we have had one large scale example of how the problem might be attacked; and there are also some data indicating favorable results from this experiment, which is being conducted in London.

The London County Council's Rheumatism Scheme has been slowly developed since 1926. Fundamentally it is based on two theses: first, that rheumatic fever is a chronic infection and hence its victims should receive adequate chronic treatment; and, second, that the relapsing nature of rheumatic fever and the consequent heart disease demand supervision over many years. It is a cooperative effort on the part of the school and health authorities, which have enlisted under their supervision the public and private institutions already organized for the care of rheumatic children; and in addition there have been built, outside of London, special units containing a total of 900 beds for hospitalizing all cases of rheumatic fever, chorea or active rheumatic heart disease in school children under 16 years of age for at least six months. This has required a minimum of one bed to 550 school children. The working of the scheme is best illustrated in the chart of the organization. The center is the rheumatism section in charge of a full-time medical officer with an adequate staff; through this section all applications for admission to the special hospital units pass. There are two types of units—one for active cases and the other for convalescent children who have recovered from recent attacks. On discharge from these hospital units the patients again pass through the rheumatism section, which assigns the child to the educational category its physical state requires and also to the proper medical supervisory authorities. Physicians in supervisory centers situated either in the schools, in private hospitals or in outpatient clinics supported by the scheme examine these patients often enough to detect recrudescence of rheumatic fever even though of slight degree; and in such instances the patient is referred again to the proper institution for treatment. These institutions are essentially hospitals or sanatoriums with both medical and educational staffs, for it is realized that suitable education and special training of these patients are important elements in their treatment. The individual hospital units have all physical provisions necessary for good medical care, including outdoor treatment in bed when that is advisable. The home conditions of all active cases are investigated, and where obviously inadequate or unfavorable, a report is submitted to proper authorities with the object of having these families better housed.

Fever Therapy by Physical Means in Dermatology

Kenneth Phillips, M. D., F.A.C.P., and A. Buist Litterer, S. B., M. D. In Arch. P. T., 21:9:533, September 1940.

Investigation of the therapeutic possibilities with physically induced fever in intractable dermatoses, extending over a period of six years, has established that successful results frequently follow the procedure in properly selected cases.

1. Fever therapy by physical means may be applied successfully to resistant and recurrent types of dermatoses.

2. Induction of fever by penetrating heat is the method of preference.

3. Anatomic and physiologic factors concerned with normal skin function are important considerations in the etiology and therapy of these skin disorders.

4. Biochemical studies of the blood and sweat indicate a common metabolic background in a number of skin diseases.

5. Correction of the underlying metabolic disorder, irrespective of the method by which it is done, frequently proves curative in a number of stubborn skin diseases, when without such regime results are disappointing.

Neurocirculatory Asthenia

C. L. Hartsock, M. D. In Cleveland Clinic Quarterly, 8:1:42, January 1941.

The problems of war and their effect upon the health of the people again are evident. The strong emotions engendered by war are certain to revive that condition which, common enough during peace times, was unusually prevalent during and following the last great war—namely, neurocirculatory asthenia.

The chronically unstable sympathetic nervous system is the fundamental pathological background giving rise to that vague clinical picture to which many names have been applied but which is best known as neurocirculatory asthenia.

To those familiar with the diagnosis and management of functional problems, the diagnosis of neurocirculatory asthenia is simple in most cases, merely made by a quick glance at the facies, a handshake and a few simple questions to analyze the personality of the patient.

The most difficult problem that confronts one from a diagnostic standpoint is to feel confident that exhaustive conditions such as early subclinical tuberculosis, undulant fever, the rheumatic state, focal infection, endocrine disturbance other than thyroid, primary myasthenias and a host of others have not been overlooked.

It might truthfully be said that no specific medical treatment can be considered to have any effect on this condition. Treatment of the annoying symptoms helps to halt the vicious cycle. Psychotherapy through instillation of confidence, while difficult to evaluate, certainly appears to be the most important treatment in this disease. A long talk with the patient is necessary to impress him with the fact that all his symptoms are due to an emotional upset of the sympathetic nervous system. This is relatively easy because the patient immediately realizes that all of his symptoms are like stage fright.

The enormous requirements for physical rest must be emphasized. Most of these patients do unusually well on ten hours of bed rest but seldom get along well on less.

A very simple and effective method of treatment in relieving the annoying vasomotor symptoms is to urge the patient to do brisk calisthenic exercises for ten minutes, endeavoring to bring out a good sweat, using adequate clothing during the exercise if sweating is difficult. Following this he should take a cold shower immediately or plunge into a tub of cold water previously drawn. Long and hot baths should not be taken as they cause further peripheral vascular dilatation. Following the cold plunge the patient first dries in the usual manner and then rubs himself with a dry, rough Turkish towel until the skin begins to glow. Following this a thirty-minute period of relaxation should be taken. Usually the patient will report a surprising amount of improvement after following this procedure for thirty days. Treatment should be undertaken at least daily and preferably twice daily. At the start the patient often resents this drastic water cure, and frequent urging to continue is necessary. If play and relaxation in a gymnasium can be incorporated with the above treatment, it is much better.

The use of medicine should be avoided as much as possible and the patient should be encouraged to believe he is not ill and, therefore, does not need medicine.

The Conservative Compensation-Derotation Treatment of Scoliosis

A. Steindler, M. D., in collaboration with C. W. Ruhlin, M. D. In J. Bone and Joint Surg., 23:1:67, January 1941.

The law that adequate treatment of deformity implies complete restoration of form as well as of function cannot be applied to the case of structural scoliosis without qualification.

In the first place, one cannot speak of restoration of form in the strict anatomical sense except in a few cases. In the second place, if recovery of function means complete automatic muscle-controlled stability and mobility, it is a requirement which can be met fully only in rare instances. Consequently, according to the standard of treatment in other deformities, the treatment of scoliosis is a compromise.

We believe that this compromise is acceptable for three reasons.

1. The important factor in the deformity is not the curve itself but rather the loss of posture which it involves—the lack of alignment between the head, shoulders and pelvis—so even if it is not possible to restore the anatomical form of the column, it is possible in a majority of cases to approach a normal posture. We call this the realignment of the spine by compensation.

2. When this passive realignment is once obtained, the musculature in a great many cases can be adequately developed to maintain actively the posture so regained, even though the mobility of the spine has been greatly reduced by the scoliosis.

3. In the absence of adequate musculature, the entire mobility of the spine can be sacrificed by fusion and the posture thus maintained passively.

One hundred cases treated conservatively by the compensation-derotation method were selected on the basis of completeness of record and time of observation. All had five years or more of posttreatment observation. The types of these scolioses were distributed as follows:

Habitual	69
Paralytic	14
Rachitic	7
Congenital	10
	100

Sixty-four of the spines were mobile and thirty-six rigid at time of the examination. Spontaneous compensation had occurred at that time in thirty cases, of which twenty-four were habitual, three congenital, two rachitic and one paralytic. Complete compensation was obtained by treatment in fifty cases, incomplete or no compensation in twenty cases.

As a result of this type of treatment the correction held in eighty cases and failed in twenty.

Conclusions

1. Compensation of the scoliosis is a necessary prerequisite for maintenance of correction and posture.

2. The combined compensation-derotation method is adequate to obtain compensation in suitable cases and leads to definite maintenance of posture.

3. The rotary deformity of the thoracic spine cannot be corrected at present. Attempts to correct the thoracic deformity by rotation to the concave side are preposterous. The thorax already is rotated to the concave side in relation to the spinal column and such attempts only make the situation worse.

4. Derotation is directed toward the lumbar and cervicothoracic section of the spine, and, by limbering up these sections, aids in the development of adequate counter curves.

5. If the compensation can be accomplished without forcible cast correction and provided muscle development is adequate, the spine need not be fused. However, if the compensation must be forced by a cast, fusion will become necessary to hold the correction obtained.

6. Failure must be expected, with or without fusion, when compensation is lost or not obtained. Only a few cases at the end of the growth period hold the correction when decompensated.

7. Failure also must be expected in the absence of adequate muscle development unless fusion is performed.

8. Compensation-derotation plus adequate muscle development promises success in the great majority of all nonparalytic cases.

9. Adequate compensation-derotation plus fusion in the presence of inadequate musculature likewise holds out promise of success in all paralytic and many congenital cases.

High Frequency Current in the Treatment of Hypertrichosis

Florentine L. Karp, M. D. In Arch. Derm. and Syphil., 43:1:85, January 1941.

The idea of using the high frequency current for the local treatment of hypertrichosis dates back more than fifteen years. Many dermatologists in this country and abroad quickly abandoned it in favor of electrolysis, their conviction being that electrolysis was still a more reliable and a safer means of treating hypertrichosis.

One of the strong points of diathermocoagulation as a local treatment for hypertrichosis is that the destruction of the papilla is accomplished almost instantly. This speed permits the removal of a far larger number of hairs during one sitting—an average of two hundred and fifty per hour, as against sixty per hour with electrolysis. The possibility of making speed certainly is of great value when a large area is involved, but there are four other essential elements to be taken into account. They are: pain during treatment, irritation of the skin after treatment, scarring and possible regrowth of hair.

The after-effects, such as irritation of the skin, are practically nonexistent when treatment by diathermocoagulation has been performed in strict accordance with the indicated rules and when due care has been taken not to remove hair too closely adjacent at the same sitting. It is the opinion of the protagonists of this method that it offers an additional safeguard by eliminating danger of irritation, which, as in electrolysis, might be reasonably attributed to the effect of the associated chemical action.

As to the matter of scarring, if the operation is carried out properly there should not be any noticeable scarring after treatment with high frequency current.

The regrowth of hair, according to those who practiced the high frequency method, is negligible.

I have come to believe that diathermocoagulation—while it requires greater skill and experience on the part of the operator because of the extremely short duration of each separate action of the current—offers a worthwhile method which deserves to be applied on a larger scale and which may even become the method of choice.

Diagnosis and Treatment of Common Peripheral Vascular Diseases of the Lower Extremities

Joseph D. Farrington, M. D. In Illinois Med. J., Jan. 1941.

Symptomatically, organic obliterative diseases of the lower extremities are very similar. In general, all the symptoms are due to curtailment of blood supply. The most important and most frequent symptom is pain or modifications of pain. Typically, this occurs during exercise, is relieved by rest and is the age-old syndrome known as "intermittent claudication."

As the disease advances, pain during exercise, relieved by rest, enters the picture. The amount of exercise necessary to produce this symptom gradually decreases and soon the patient begins to complain of pain at rest. Lastly we have the severe agonizing pain seen in cases with ulceration and gangrene.

The appearance of the extremities is very important and inspection should be thorough. Both extremities should be bare during the examination and should be compared. The skin in many instances is normal; though, if sufficient disturbance of the nutrition has occurred, it may be dry, thin and shiny. Color changes occur and vary according to the extent of the circulatory insufficiency.

In advanced cases, the foot may be very pale, almost cadaveric in appearance. Ulceration and gangrene occur in late cases. Ischemia is perhaps the most important single objective sign in circulatory disturbances of the extremities. Surface temperature changes are important and at times sufficiently marked to be detected by the examiner's palm. Palpation of the peripheral vessels offers a fair and simple criterion of circulation in the extremities.

Palpation is done at four sites. The femoral is palpated below the middle of Poupart's ligament, the popliteal in the popliteal triangle, the posterior tibial below the internal malleolus and the dorsal pedal on the dorsum of the foot.

Injection of histamine phosphate, 1-1000 solution, intradermally reveals the status of the superficial circulation. The oscillometer is a comparatively recent instrument developed for accurate measurement of the amplitude of peripheral pulsation.

The patients with arteriosclerosis are as a rule elderly and have had symptoms usually for weeks or months, while those suffering with thrombo-angiitis obliterans are as a rule under forty-five years of age and give a history of symptoms over a period of years. Thrombo-angiitis obliterans is limited almost entirely to the male. The early development of arteriosclerosis in the diabetic must be considered, as here we see patients forty-five years or younger.

Pathologically there is a great difference in the two conditions. While arteriosclerosis obliterans involves the arteries alone, thrombo-angiitis obliterans involves either the artery or vein and usually both. The treatment of these conditions with their complications of severe pain and gangrene may be divided into two types, namely, conservative and radical. Treatment of the uncomplicated case is as a rule ambulatory and its active part rests entirely with the patient. The seriousness of the condition must be stressed. All general complicating conditions such as diabetes must be rigidly cared for. Tobacco in all its forms should be eliminated. Well fitting roomy shoes should be advocated, and at times linings of sheep skin used. Bed socks are of value, being much safer than heating pads so often used. Daily sitz baths are advantageous and constitute a simple method of increasing peripheral circulation.

Medication is used to some extent. Postural exercises have a definite place in the uncomplicated case, but should not be used in cases with ulceration or gangrene or if pain follows. The act of elevating the extremities, flexing the ankles, etc., uses some of the vital oxygen in cases of gangrene. The patient should lie flat on his back in bed and elevate the legs to 45 degrees. The ankles should be flexed and extended rapidly, the time consumed for blanching and emptying of all the veins noted. This is recorded, averaging as a rule two minutes, and is the standard time for elevation in that particular patient. The position is now changed so that both legs hang over the side of the bed in the sitting position and the time necessary for the appearance of rubor noted, being an average of three minutes.

The third position is one of recumbency and should be the total of the first two phases of treatment. The three phases constitute one cycle of treatment and should be repeated four or five times in succession, twice to three times daily.

Passive venous hyperemia instituted with a specific cuff of ordinary sphygmomanometer is by far the simplest and most effective of all. The traditional heat cradle should be discarded and the heat of the limb preserved by wrapping in layers of wool or cotton. With the heat cradle two major objections arise. First, likelihood of injury, due to the patient striking his extremity against the cradle. Secondly, the abnormal amount of heat present. In tissues deprived of

their circulation the normal hyperemia which occurs in response to heat to cool the part is not present, and further destruction ensues.

Postural exercises are contraindicated in the treatment of complicated cases, but the cuff, pavex or tilting bed are of great aid to healing and preventing extension of the tissue destruction.

With hard work and cooperation by both patient and physician, limbs often can be saved and used, rather than confined to jars in pathological laboratories.

Faradic Shock in Treatment of Functional Mental Disorders: Treatment by Excitation Followed by Intravenous Use of Barbiturates

Nathaniel J. Berkwitz, M. D., Ph. D. In Arch. Neuro. and Psychiatry, October 1940.

The term "faradic shock" treatment has been chosen for the method described in this paper. The word "shock" is used to denote sudden and intense stimulation. A faradic (interrupted) current is employed to produce a maximal amount of stimulation with a minimal amount of current. The current used is well within the margins of safety. It does not cause burns and is not powerful enough to produce dangerous effects, such as unconsciousness or irreversible physiologic changes. The patient is not even momentarily stunned, although momentary excitement and fear are produced. As with insulin and metrazol shock treatment, the blood pressure is elevated about 20 to 40 mm. of mercury immediately after the faradic shocks are given, but an hour after the treatment the blood pressure generally drops to about 5 to 15 mm. of mercury below the initial reading.

Pentothal sodium amytal, the amount varying according to the patient's need, is administered intravenously immediately after the faradic shocks are given. Pentothal sodium is generally used unless the patient is stuporous and uncommunicative.

No patient was given more than twenty-two treatments. Although the course of treatment is completed in less than three weeks, most of the patients are kept in the hospital at least two weeks more for further psychotherapy and observation.

The chief reason why many physicians do not employ shock therapy is that they believe the possibility of serious complications which may arise from its use is too great.

In all types of shock therapy two conditions are known to occur, namely, (1) physiologic stimulation, followed by (2) depression or temporary inhibition of the higher cerebral centers. I use electricity (faradic current) for stimulation, and intravenous injections of barbiturates for inhibition of the higher cerebral centers. With this procedure faradic shock treatment is under better control and is safer than other present forms of shock therapy.

Seventy-three patients with various mental disorders were treated, with results paralleling those reported with other forms of shock therapy. More striking results were obtained in conditions in which the personality was acutely and more or less totally involved (as in paranoid and catatonic types of schizophrenia than in conditions in which it was partially involved (as in psychoneuroses over a long period. Five patients with schizophrenia had relapses after treatment, but all responded quickly with further treatment.

Faradic shock treatment does not produce as profound physiologic changes as other forms of shock therapy in current use, but it can be controlled better, it is safer to use and it is relatively more simple and inexpensive to administer. Its use is recommended before the more drastic forms are tried.

Faradic shock treatment is another means of approach to an intricate problem. It may clarify knowledge as to the proper treatment of psychoses, and it may offer new understanding of the mechanisms involved.

A New Type of Filter for Efficient Infra-Red Radiation

F. H. Krusen, M. D. In Proc. Staff Meetings, Mayo Clinic, 16:2:22, January 8, 1941.

Recently a new type of lamp known as a "black bulb infra-red lamp" was tried clinically. It was hoped that this would be an advance in infra-red lamps as the black glass bulb employed transmitted a high percentage of infra-red rays but little visible light. It was believed that this bulb could be practical in reducing glare from heat lamps of high wattage. Such glare may be particularly annoying to a patient if the lamp is applied to the face or front of the body.

I have employed this lamp clinically for more than six months and I find it to be entirely satisfactory for therapeutic purposes. Glare is eliminated yet a large percentage of the more penetrating near infra-red rays is available for therapeutic irradiation. This black glass filter, when placed at the opening of a reflector which contains an ordinary luminous heat bulb, serves the same purpose as the black glass bulb and eliminates the danger of explosion.

Physical Agents in the Treatment of Fractures

John S. Coulter, M. D. In J. Indiana State Med. Assoc., 33:12:670, December 1940.

It is obvious that heat and massage will not heal torn blood vessels, ligaments and muscles, but heat and superficial stroking massage will assist in restoring the circulation on which repair depends. In the open splinted fracture, taking it for granted that the fracture has been reduced and that sufficient time has elapsed for hemorrhage to have ceased, it is possible soon after reduction to apply heat twice daily for periods of 20 minutes. We use radiant heat from an electric lamp "baker". These bakers use four 60-watt lamps and can be made by a mechanic at a cost of approximately five dollars.

In our practice the application of diathermy to fractures in a cast or splint has proved impractical. The use of mild heat for several periods of thirty minutes each day has proved of such value that we are convinced of its usefulness in the post-reduction and after-treatment stages.

In the post-reduction period with open splinting it is possible at times to use massage with advantage. In some fractures in addition to the local swelling from the local hemorrhage there is a general swelling of the limb which often is due to a reflex disturbance of the vasomotor mechanism. In superficial stroking massage we have an agent that produces a reflex effect to counteract this vasomotor disorganization.

In the post-reduction period, exercises may be used also while the limb is in the splint if the physician will give definite directions. Especially useful is "muscle setting." This consists of the alternate contraction and relaxation of a muscle or muscle groups without producing joint motion. In a case of fracture of the leg the patient is taught to contract and relax the quadriceps muscle without movement of the knee.

The patient during this period should be definitely instructed to use the other muscles of the limb which are not in the cast. In a Colles' fracture, with the wrist and forearm in a cast, the fingers and thumb can be exercised by squeezing a soft rubber ball. The elbow and shoulder may be exercised by brushing the hair with the palm of the hand starting from the front and continuing to the occipital region.

Underwater exercise is the most important physical agent used in the treatment of fractures. Every hospital should have a Hubbard Tank. All fractures of weight-bearing bones and fractures of the humerus can be exercised in this tank to advantage. The buoyancy of the water eliminates the gravitational load and allows exercise with the least possible strain on the injured bones and muscles.

Any physician can arrange for patients to have occupational therapy. In most cases of injury it is not possible to send them to a curative workshop following the physical therapy. The ordinary physical therapy given to a patient, at the most, lasts only an hour and the exercises have certain definite limitations. The human body is more than a machine, and the formal repetition of a movement either with or without an apparatus is not of maximum therapeutic value in increasing the amount of movement in a stiff joint or as an integral part of a larger coordinated movement, because there is no psychological stimulant for personal incentive on sustained effort. Occupational therapy can be applied at home if the physician will give the necessary directions to the patient and a member of the family.

The Medical Management of Fractures

Charles F. Nelson, M. D., and Roland C. Nelson, M. D. In J.A.M.A., 116:3:184, January 18, 1941.

The subject of delayed union and nonunion of fractures is still in a state of confusion. The orthopedic surgeon has made great strides in his department of the practice of medicine, but this progress is limited largely to the mechanical aspects of orthopedics. He has not scientifically explained the causes of delayed union or nonunion of fractures or of bone disease, especially arthritis.

The literature on factors concerned in metabolism of bone is confusing and is to a great extent confined to the study of individual elements without due regard to the relationship of all the physicochemical processes involved and their clinical interpretation and application to growth and regeneration of bone.

Contrary to the generally accepted opinion as to the causes of nonunion of fractures, anything affecting the general physiology of the patient, such as endocrine imbalance, vitamin insufficiency and disturbed blood chemistry (especially the electrolytes), is potentially a causative factor in delayed union or nonunion of bone.

The Specific Factors Governing Bone Metabolism

1. Calcium and phosphorus concentrations of the serum.
2. The calcium-phosphorus ratio of the serum
3. Activity of the parathyroid gland.
4. Vitamin D levels.

Low Calcium—Low serum calcium may result from impaired parathyroid function, insufficient calcium intake and absorption or too much phosphorus consumption or retention.

Low Phosphorus—Low serum phosphorus may result from hyperparathyroidism, low phosphorus intake, high calcium absorption and insufficient vitamin D intake.

The calcium regulating function of the parathyroid has been known for several years. The fundamental nature of the action of solution of parathyroid on serum calcium and on the mobilization of bone calcium has been the subject of much discussion.

Impaired parathyroid function allows an increase in serum phosphorus concentration and a decrease in serum calcium concentration. This increase in phosphorus concentration may decrease the ionized calcium to the degree of producing tetany.

For centuries vitamin D in the form of cod liver oil has been used in the treatment of rickets, which is always due to a deficiency in serum phosphorus. Serum calcium levels may be normal, low or high.

Vitamin D increases the serum phosphorus concentration much more rapidly than the serum calcium, resulting in a short time in a low serum calcium-phosphorus concentration ratio. This may produce nonunion. The promiscuous use of vitamin D, especially viosterol, may be dangerous.

The authors have shown that young rats on a calcium deficient diet with vitamin D (concentrated cod liver oil) develop marked osteoporosis. The bone is replaced by fat. Compere has reported that vitamin D, even with extra calcium, delays union of fractures in some rats.

Vitamin D is not effective without a sufficient intake of phosphorus-containing foods. This fact has been almost completely overlooked in the treatment of rickets and is responsible for failures even when large doses of vitamin D have been administered.

In the treatment of fractures in cases of low serum calcium alone one need not consider vitamin D medication. Most of these fractures will heal quickly enough so that vitamin D deficiency will not become a problem.

In cases of low phosphorus the authors have found that the administration of from 2,500 to 3,000 units of vitamin D daily is sufficient.

For many years the orthopedic surgeons have observed the beneficial effect of the administration of thyroid in the treatment of some cases of delayed union. This is due to the establishment of normal oxidation of all tissues and not a direct effect on bone.

The authors recommend that blood chemistry determinations be made early in all fracture cases so that accurate medical management can be instituted immediately.

Frostbite of Extremities: Clinical and Pathologic Considerations in Its Diagnosis and Treatment

Frank V. Theis, M. D. In Arch. P. T., 21:11:663, November 1940.

Preventive measures include extreme care against exposure to cold weather when there is a high wind velocity, by individuals wearing tight or wet shoes and gloves, or those with circulatory disease, or heavy smokers.

In the treatment of acute frostbite the application of heat to the affected part is particularly injurious and often leads to rapid mummification of the tissues. The increase in local tissue metabolism as a result of the extra heat requires an increase in oxygen supply which is not available because of the vasomotor ischemia. By slowly elevating the temperature of the exposed part, the increase in circulation will be in advance of the demand for increased oxygen by the tissues. For this reason heat or energetic massage should be used with great caution in all cases of peripheral circulatory disease.

For the gradual elevation of temperature and increase of the circulation, the application of snow or cold water and very gentle rubbing are generally recommended. Novocain block of the regional sympathetic nerves is of definite value in producing vasodilatation in the acute as well as the chronic vasomotor stage. It is the belief of the author that satisfactory results are obtained by conservative measures with Pavaex treatments without submitting the patient to the hazard of an operaion.

Pavaex treatment with reflex heat has proved of definite value in vasomotor frostbite and for the more rapid demarcation of gangrenous parts. Alternating positive and negative pressure, in conjunction with the action of reflex heat of 45 C. placed on the abdomen, augments local tissue metabolism in addition to increasing the circulation in the extremities. The beneficial effect of this form of treatment is due to increased oxygen and carbon dioxide exchange in the tissues without the deleterious effect of direct heat. Treatment must be adequate and proper to assure satisfactory results.

Local amputation of gangrenous parts should be delayed until definite demarcation has taken place and the circulation has been sufficiently restored in the surviving tissue.

Electrically Induced Convulsions in the Treatment of Mental Diseases

Renato Almansi, M. D., and David J. Impastato, M. D. In New York State J. Med., 40:17:1315, September 1, 1940.

The most important advantage of electroshock is the absolute unconsciousness produced. Thus, the patients, having no memory of the attack, do not show any reluctance to continue the treatments. Secondly, it is always possible to produce an attack once the convulsive threshold has been determined. This avoids the excitement which follows an insufficient dose of metrazol. In general, there is no postconvulsive excitement, or when it is present it is very mild. The convulsion is less violent than that produced by metrazol. The method is simple and can be applied to a large number of patients with a minimum personnel.

The machine is supplied by the ordinary alternating house current of 110 volts. It contains two circuits: a direct to measure the resistance of the patient's head, and an alternating to produce the convulsion.

Patients who are to be subjected to this treatment are examined psychiatrically, neurologically and medically. X-rays of the skull, spine, heart and lungs, and electrocardiogram, electroencephalogram, blood and urine studies are performed. When these examinations disclose that the patient is suffering from an organic disease of the cardiovascular system, or the nervous system, he is not given the treatment. Similarly, we do not treat patients over 50 years of age.

Treatment of Some Common Disfigurements of the Skin

A. Benson Cannon, M. D. In New York State J. Med., 40:21:1567, November 1, 1940.

Moles—The author has removed many thousands of moles of all sizes, colors and descriptions, using the desiccating current of the electric needle or the bipolar current of the surgical diathermy machine and has yet to see a malignancy develop after such an operation. But he has known instances in which incomplete surgical excision of a mole or its removal by actual cautery or with trichloracetic acid was followed by the early appearance of a melanocarcinoma. For when the mole is removed by means of a desiccating current, the desiccated tissue sloughs off and the blood vessels are sealed, thus lessening the possibility of metastasis through the blood stream. Surgery merely removes the mole but leaves the severed blood vessels open to the passage of the cells, with the result that by the time the blood vessels are finally healed, metastasis already has occurred.

Pigmented Moles—As is the case of the ordinary mole, the author's advice is always to remove any pigmented mole immediately by desiccation or by surgical diathermy without waiting to see whether or not it is going to undergo any changes in color, size or form; for once such changes have set in, the case has already advanced far beyond any possibility of cure, regardless of what method of removal be employed.

Seborrheic Keratosis—To remove the ordinary seborrheic keratoses from the face and neck, or the large, irritated ones from the trunk, Cannon uses the desiccating needle, first anesthetizing the area to be treated with procaine hydrochloride. After desiccating the keratosis he curettes the charred portion away and redesiccates the base of the lesion.

Senile Keratoses—The technic for the removal of senile keratoses is the same as that used for seborrheic keratoses, the only difference being that since the lesions are so much larger and more infiltrated and extend so much more deeply than do seborrheic warts they have to be desiccated much more thoroughly than do the lesions of the last-named disease.

Epitheliomas—The best therapeutic results are obtained by removing the growth, under local anesthetic, with the electric needle or the electric knife and then curette, always being careful to go well beyond the borders of the growth. After the area has been thoroughly curretted, redesiccate it and immediately afterward apply roentgen therapy (750 r, unfiltered), again taking care to go far beyond the edges of the wound.

Polyradiculoneuritis (Guillain-Barre Syndrome): Following the Use of Sulfanilamide and Fever Therapy

Drs. Paul H. Garvey, Nathaniel Jones, and Stafford L. Warren. In J. A. M. A., 115:23:1955, December 7, 1940.

The six cases reported can be summarized together from the time the fever treatments were given. Each patient was given fifteen hours of fever at 41.5 C., without any unusual complications at the time of treatment or immediately thereafter. In each case there developed within a period of from ten to sixteen days (except in case 6) following fever treatment a neurologic syndrome, unaccompanied by fever, which was remarkably constant. The most constant feature was motor disturbances involving the muscles of the pelvic girdle and lower extremities resulting in a waddling type of gait which was not unlike that seen in progressive muscular dystrophy. Severe radicular pains, muscle nerve tenderness

and mild dysthesias occurred in several of the cases. In no instance were there symptoms referable to the cranial nerves or sphincters. The positive neurologic signs in all cases were limited to the lower half of the body and consisted of muscular weakness resulting in a waddling gait, diminution or absence of the tendon reflexes, minimal disturbances of deep and superficial sensation, and nerve tenderness. Three of the patients complained of marked hyperhidrosis of the feet. Spinal fluid examination in six cases yielded a normal spinal fluid except for an increase in the total protein content ranging between 100 and 240 mg. per hundred cubic centimeters without any increase in the number of cells.

The prognosis in these cases has been favorable for recovery. Pain and tenderness of the nerves and muscles subsided within a week or two. However, the return of muscular power takes much longer and it is usually from four to six months before the gait returns to normal. The abnormality of the spinal fluid is likewise slow in clearing.

Treatment of these cases consisted of the usual therapy for cases of polyneuritis due to other causes (relief of pain, rest of muscles, and so on).

Analysis of these cases would seem to eliminate sulfanilamide and hyperthermia per se as the cause of the syndrome.

It would seem that the disorder is the result of the activation of some infectious agent, perhaps a virus, by the fever.

Hypertensive Disease

Edward J. Stieglitz, M. D., M.S., F.A.C.P. In J. Michigan State Med. Soc., 39:11:827, November 1940.

Physical measures frequently are beneficial auxiliaries in obtaining the desirable rest and relaxation. Warm baths, massage, sunshine and congenial noncompetitive sports all have their place as useful adjuncts in selected cases. The benefits to be derived from sojourns at spas and watering places depend largely upon the economic status of the patient and whether such an environment will be congenial. To urge a man to spend several weeks at an expensive spa, when he cannot afford it, merely increases his worry: the net consequence is harm. We must not forget also that one of the greatest sources of benefit in these places is the increased fluid intake which usually is ritualized; this may be accomplished much more economically at home. Diathermy, appropriately applied, reduces the arterial tonus, but the induced relaxation is but temporary and of little lasting benefit.

Aid in reducing the physiologic burdens of the injured structures in hypertensive disease may be rendered by many different therapeutic measures. The choice and application of these must be individualized, for each patient presents a different psychic as well as physical problem. Wisdom and judgment in the choice of measures distinguish the wiser physician from those chiefly concerned with symptomatic treatments. Let us learn from Gilbert and Sullivan's Mikado: "our object all sublime" should be to let the therapy fit the patient.

All curative therapy falls into three fundamental categories: (1) therapy directed against etiology; (2) therapy intended to reduce the physiologic burden of injured structures; rest, and (3) therapy directed toward improvement of tissue respiration and nutrition. To neglect the institution of any one of these principles is to advise incomplete and inadequate treatment.

Histamine Cataphoresis In Rheumatic Conditions and in Disturbances of the Peripheral Circulation

David H. Kling. In Med. Record., 152:11:388, December 4, 1940.

Summary—The new series of 236 cases of various types of peripheral circulatory and rheumatic affections continues our studies of histamine iontophoresis which has now reached a total of almost five hundred cases.

Histamine iontophoresis is efficient in myositis, tenosynovitis, bursitis, in sprains, neuralgia and neuritis. Of the various types of arthritis, traumatic arthritis is treated with marked success. In rheumatoid and osteoarthritis symptoms due to disturbed peripheral circulation, especially in the hands and feet, are favorably influenced. The larger joints do not respond as well. The percentage of recurrences is high. The transitory amelioration of pain, stiffness and increased motion, however, may be taken advantage of to carry through a long-range program of orthopedic, dietary or medical treatment. In peripheral circulatory diseases histamine iontophoresis exerts a definite beneficial effect and should be employed together with other types of treatment. The powerful effect of histamine on the capillaries and arterioles permits the application of very high dilutions, short duration and very weak amperage. This, in turn, makes the treatment economical, simple and flexible. It avoids untoward general reactions, permits a frequent repetition, prolonged continuation and home treatment.

Book Reviews

A PEDIATRICIAN IN SEARCH OF MENTAL HYGIENE. By Bronson Crothers, M. D. Cloth. Price, $2.00. Pp. 271. New York: The Commonwealth Fund, 1937.

It is generally recognized that preventive therapy is most desirable in meeting the problems of mental disorders. The "field of battle," therefore, resolves itself to the domain of the child. Psychiatrists have long been aware of the importance of tackling the problem here, and as a consequence the child guidance movement has develop by leaps and bounds. Realizing that it is the pediatrician who deals primarily with children, the present author emphasizes the need for further interest in this subject on the part of the child specialist. He recommends ample training in child psychiatry as a part of the pediatrician's internship and recommends closer relationships between him and the work of the psychiatrist and psychiatric social service department.

BERKELEY MOYNIHAN, SURGEON. By Donald Bateman. With a preface by Lord Moynihan. Cloth. Price, $4.00. Pp. 354, with 8 illustrations. New York: The Macmillan Company, 1940.

This is the account of the life of the first Baron Moynihan of Leeds, the most famous English surgeon of his day. It is a narrative of a life that could have been lived only in a democracy such as exists in Great Britain and the United States.

Moynihan's father enlisted in the English army as a private. For heroic actions he was among the first to receive the Victoria cross and was elevated to become Ensign Moynihan. Berkeley was born in Malta in 1865.

The story of Berkeley Moynihan's career through his childhood, as a student and young physician and then on the road to success is readable and inspiring. While still a young surgeon he had to make a choice between an easy, fashionable practice or surgery practiced as an art and science, and not as trade alone. He did adopt this latter course. Bateman states that he conducted a ceaseless guerilla-like research along the whole front of surgery, making repeated little advances all along the line; so that, at the end, he had, by his own endeavor, advanced the entire front of surgery. He was his own general, leading his own mass attack. A picture of the variety of Moynihan's researches is given by the titles of his papers and books.

It is astonishing to read how surgical technic has changed in a few decades. Moynihan visited America first in 1903. Before going to America he had introduced the practice of wearing a white coat in which to operate. On his return from America he brought back with him several pairs of rubber operating gloves that had been presented to him in America. These gloves caused even more fun to be poked at him in Leeds than had his white coat.

The chapters on his experiences in the World War, his busy years and the rewards before the end are likewise interesting. After the war the medical profession paid him many honorable tributes for his great services to surgery. He developed into a great orator. One of his most impressive speeches was on the occasion of his presentation of a Great Maces on behalf of the Consulting Surgeons of the British Armies to the American College of Surgeons.

This volume can be ranked high in the list of biographies of medical men.

HOSPITAL FOR THE RUPTURED AND CRIPPLED: A HISTORICAL SKETCH WRITTEN ON THE OCCASION OF THE SEVENTY-FIFTH ANNIVERSARY OF THE HOSPITAL. By Fenwick Beckman, M.D. With a foreword by Philip D. Wilson, M.D., Surgeon-in-Chief. Cloth. Price, $3.00. Pp. 157, with 11 illustrations. New York, 1939.

This volume is important in medical history because the founding of this institution represented the first organized effort to provide specialized treatment for crippled children and marked the beginning of a new epoch in their lives. The history of a hospital caring for many orthopedic cases offers much of interest to those devoting their lives to physical therapy.

The founder and surgeon-in-chief from 1863 to 1887, Dr. James Knight, was an advocate of physical therapy. An instructor in gymnastics was appointed in 1871, and a reproduction of an interesting print from Leslie's Weekly of 1875 shows the children exercising in the winter garden on the roof of this hospital. Doctor Knight also became enthusiastic over the use of static electricity.

In 1894 Doctor Gibney improvised a well-equipped gymnasium for the treatment of lateral curvature of the spine. A masseur was appointed to the staff in 1897. In 1923 the Medical Board recommended to establish a complete department of physical therapy. Doctor Kristian Gosta Hansson was chosen as the director of the department in 1924 and has continued in this position to the present time.

PSYCHIATRIC CLINICS FOR CHILDREN WITH SPECIAL REFERENCE TO STATE PROGRAMS. By Helen Leland Witmer, Ph. D., Research Associate, National Committee for Mental Hygiene. Cloth. Price, $2.50. *Pp.* 437. *New York: The Commonwealth Fund; London: Oxford University Press,* 1940.

The author states that: "Those who promote the mental health of children through psychiatric services are riding upon a full tide." She then procedes to give a historical review of this movement in child psychiatry and describes the fundamental organization of the successful child guidance clinic. Careful criticism of several of the state institutions is presented with a view toward constructive correction. This is followed by a discussion of principles for future programs for the promotion of better mental health.

This book can be heartily recommended to those who are interested in child guidance and mental hygiene efforts.

THE TREATMENT OF DIABETES MELLITUS. By Elliott P. Joslin, A. M., Sc. D., Medical Director, George F. Baker Clinic, New England Deaconess Hospital, Boston; Howard F. Root, M. D., Physician, New England Deaconess Hospital; Priscilla White, M. D., Physician, New England Deaconess Hospital, and Alexander Marble, A. M., M. D., Physician, New England Deaconess Hospital. Seventh Edition. Cloth. Price, $7.50. *Pp.* 783, *with* 9 *illustrations. Philadelphia: Lea & Febiger,* 1940.

The seventh edition of this classic work represents the long experience of Doctor Joslin and his associates in the active care of diabetes. No other volume on diabetes presents so much statistical material in such accurate form. Its tables demonstrate the improvement in treatment and show where the complicating dangers lie. The chapters on physiology and pathology are interpreted from the clinical viewpoint and are valuable in the management of the disease. The chapter on diet has been revised, simplified and condensed yet includes the place of vitamins and minerals in diabetes with tables of standard values.

This volume is of interest to physical therapists as the question of exercise and diabetes is given considerable space. The following subjects are discussed: diabetes incidence and exercise; athletics in etiology of diabetes; exercise and the utilization of carbohydrates; blood sugar and exercise; hypoglycemia due to exercise; foot and Buerger's exercises in the prophylactic treatment of diabetic gangrene; exercises as an aid in the prevention and treatment of constipation; passive vascular exercises and intermittent venous occlusion in the treatment of peripheral vascular disease in diabetics and the use of exercise in the treatment of diabetes.

This book should be in the library of every general practitioner, and it is a valuable reference book for physical therapy technicians.

THE CRIPPLED CHILD IN NEW YORK CITY: REPORT OF THE COMMISSION FOR STUDY OF CRIPPLED CHILDREN. Cardboard. Pp. 218. *Compliments of the Commission for Study of Crippled Children, Dr. Lyman C. Duryes, Director,* 303 *Ninth Ave., New York City,* 1940.

In this report of the Commission for Study of Crippled Children, Dr. Philip D. Wilson, Chairman, considers impartially the needs of the crippled child in New York City. There are two sections of special interest to physical therapists. In a survey of 27 hospitals the commission found that the qualifications of physical therapy technicians in some hospitals fell below the standard submitted to the Children's Bureau by the Council on Medical Education and Hospitals of the American Medical Association and the American Physiotherapy Association. The commission believes that an effort should be made to bring the professional qualifications of these workers up to the standards noted.

According to this report the apparatus available in a well equipped hospital with an active orthopedic service should include a therapeutic tank, tables and booths for massage and muscle training, mercury vapor or carbon arc lamps for ultraviolet ray therapy and equipment for heat and electrotherapy. Of the 27 hospitals only 13 had equipment for underwater treatment.

In convalescent homes the commission believes that facilities for physical therapy should be provided. The treatment should be carried out by trained physical therapy technicians, except in institutions which admit only children with bone and joint tuberculosis where ultraviolet radiation may be given by nurses.

This is an interesting report and lays the foundation for a program for crippled children which will encourage restorative and rehabilitative processes so that the crippled child with minor disabilities or those well compensated will no longer require special consideration.

SURGICAL NURSING. By E. L. Eliason, A.B., M.D., Sc.D., Surgeon, University of Pennsylvania, Philadelphia General and Presbyterian Hospitals, Philadelphia, L. Kraeer Ferguson, A.B. M. D., F.A.C.S., Assistant Professor, University of Pennsylvania Medical School, Philadelphia, and Evelyn M. Farrand, R.N., B.S., Instructor in Nursing Arts and Surgical Nursing, University of Pennsylvania Training School for Nurses. Sixth edition. Cloth. Price, $3.00. Pp. 673, with 245 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1940.

This is the sixth edition of this excellent book since its first appearance in 1929. This edition has been thoroughly revised and reedited. The subject material is arranged as far as possible to conform to the "Curriculum Guide" for schools of nursing. This has necessitated a complete rearrangement of the subject matter in many instances and the addition of many new topics.

The book is divided into thirteen parts or units. The first part is devoted to an introduction to surgical nursing. Following this are units on nursing in conditions of the respiratory system; of the circulatory system, blood and blood forming organs; alimentary system; urinary tract; integumentary system; eye and ear; endocrine glands; nervous system; musculo-skeletal system, and reproductive system. There are two final units on surgical communicable diseases and operative aseptic technic.

The chapter on orthopedics, surgery and nursing care is too brief. For instance, only one page is devoted to infantile paralysis which is an important part of orthopedic nursing. It is here stated that massage and electrical treatments should be given but reeducation and underwater exercises are not mentioned.

The book is well written and there are some excellent illustrations. At the end of each unit there is a valuable list of references and suggested readings. This volume can be highly recommended as a textbook for training schools for nurses.

GOVERNMENT AND ECONOMIC LIFE: DEVELOPMENT AND CURRENT ISSUES OF AMERICAN PUBLIC POLICY. VOLUME II. By Leverett S. Lyon and Victor Abramson. The Institute of Economics of The Brookings Institution Publication No. 83. Cloth. Price, $3.50. Pp. 1301. Washington, D. C.: The Brookings Institution, 1940.

The first volume of this study dealt with governmental implementation and regulation of private enterprise as it has been applied generally to a wide range of industrial and commercial life, without important distinctions betwen one type of industry and another. The Brookings Institution is devoted to public service through research and training in social sciences.

This book begins with a further analysis of governmental implementation and regulation of private enterprise but of a type different to that described in Volume I. The relationships here considered are those in which limited areas of economic life or limited time periods have been singled out for special governmental treatment. It is shown that special action by government is not always limited to industrial areas. There are periods as well, when the controls of government over individual discretion become so far-reaching as to call for special analysis. The two illustrations of such control considered are the period of the National Recovery Administration and the periods of war.

This volume is of interest to those who wish an interpretation of American public policy in relation to our economic life. It discusses many issues of vital interest to all citizens of this country such as how our social security program has operated; what issues are raised by government competition with private business; what difficulties arose in organizing our economy during the World War and how have we planned to overcome them if we become involved again.

HYDROCEPHALUS: ITS SYMTOMATOLOGY, PATHOLOGY, PATHOGENESIS AND TREATMENT. By Otto Marburg, M. D. Cloth. Price, $3.00. Pp. 217, with 28 illustrations. New York: Oskar Piest, 1940.

This is a monograph on the subject of "water on the brain", written by a recognized authority in the field of neurology. In dealing with the symptomatology, pathology, pathogenesis and treatment of hydrocephalus the author expresses himself in a manner which will be found to be rather dogmatic. While other excellent workers, briefly referred to by Marburg, are aware of the problems which still confront us regarding this morbid condition of the brain and who consequently express themselves quite conservatively, the present author is guilty of making definite statements which imply that the subject is a "closed book." Despite this criticism, the book contains much informative material on the subject of hydrocephalus.

HYDROTHERAPY IN PSYCHIATRIC HOSPITALS. By Rebekah Wright, M. D. Hydrologist, Massachusetts Department of Mental Health. Cloth. Price $4.00. *Pp.* 334, *with* 91 *illustrations. Boston: Tudor Press, Inc.,* 1940.

This book is a revision of "Hydrotherapy in Hospitals for Mental Diseases." The text has been revised and rearranged. Descriptions of several procedures have been added, and a number of new illustrations inserted. The section on the "Construction of Hydriatric Suites" has been omitted, as it is to be rewritten and printed as a manual.

This volume presents in concise detail the technic of the hydriatric procedures that have proved practicable in hospitals for mental diseases. It instructs physical therapists in the management of a hydrotherapy department. It outlines for psychiatrists the hydrotherapeutic indications in the conditions which accompany the various psychoses and emphasizes the importance of precise prescriptions for hydrotherapy.

The book is divided into three parts: part one for physicians, and parts two and three for nurses and physical therapists. The technic instructions are clear and well illustrated. It can be highly recommended to nurses and physical therapists in psychiatric hospitals.

BORN THAT WAY. By Earl D. Carlson, M. D., Cloth. Price, $1.75. *Pp.* 174. *New York: The John Day Co.,* 1941.

In Doctor Carlson's book we have an unique record: the record of one who is afflicted with the condition about which he writes, and one who is a physician and knows the condition from a medical standpoint. There are medical documents written by physicians who are themselves afflicted with the diseases about which they write, but anyone who is familiar with the spastic victim knows that this disease, or condition, presents problems which do not exist in any other disease. The true record of any spastic would be an interesting and enlightening one, but when that record is made with a knowledge of the workings of the nervous system as well as from the experience of a spastic, we have something which, to our knowledge, hitherto has not been achieved.

The book is not a medical treatise on cerebral palsy, however. The first five chapters are primarily autobiographical. In these the author relates his experiences in his struggle to cope with and overcome his handicap: through the harassing days of childhood, the school days, the college years, the early working experience, the medical school. It is chiefly in these chapters that one gets the picture of the spastic as he himself presents it. The picture is not only objective; is it likewise subjective. Not only does one see the arms and legs making the familiar uncoordinated movements; one learns the spastic's reactions to those uncontrolled and useless gestures.

The remaining chapters tell, in a very readable way, about Doctor Carlson's experiences in the Neurological Institute where he works with spastic children. In this section, he offers some excellent suggestions in the management and treatment of spastics, and presents many examples of the difficulties and achievements of children who come to his clinic.

The book may be read with interest and profit by all who are afflicted as the author is, and by all who are in any way connected with spastics: physicians, physical and occupational therapists, nurses, teachers, parents. It may well be read by any who are physically handicapped — yes, even the so-called normal could take a few lessons from this book.

EXPERIMENTAL POLIOMYELITIS. I *A CRITICAL REVIEW OF THE LITERATURE WITH SPECIAL REFERENCE TO THE USE OF THE NEUTRALIZATION TEST IN IMMUNOLOGICAL STUDIES.* II: *THE NEUTRALIZATION TEST. A STUDY OF SOME FACTORS INVOLVED IN THE NEUTRALIZING ACTION OF IMMUNE SERUM AGAINST POLIOMYELITIS VIRUS. By Morris Schaeffer, Ph. D., and Ralph S. Muckenfuss, M. D., Department of Health, Bureau of Laboratories, New York, N. Y. Published under the auspices of the National Foundation for Infantile Paralysis. Cloth. Pp.* 158, *New York,* 1940.

This is a monograph of experimental work on poliomyelitis which deals with immunological studies. The authors have made a thorough review of the literature of immunology in poliomyelitis, paying special attention to neutralization tests. The authors feel that the test is a specific antigen-antibody reaction but the practical application of this test still awaits further study and improvement. Schaeffer and Muckenfuss have carried out numerous experiments, and their report contains much valuable data which will be of special interest to those working in this phase of the widespread study of poliomyelitis.

DYNAMICS OF INFLAMMATION: AN INQUIRY INTO THE MECHANISM OF INFECTIOUS PROCESSES. By Valy Menkin, Department of Pathology, Harvard University Medical School. Boston. Cloth. Price, $4.50. Pp. 244, with 50 illustrations. New York: The Macmillan Company, 1940.

This is the latest publication of the "Experimental Biology Monographs." The term inflammation refers to the aggregation of several interdependent reactions incited by the presence in normal vertebrate tissue of a foreign body or so-called irritant. The phenomenon of inflammation, as manifested in the vertebrate kingdom, may properly be regarded as the physical basis of infectious processes. It is to be remembered that essentially the manifestation of inflammation tends to develop along a uniform pattern irrespective of the irritant.

This monograph summarizes the recent evidences relating inflammation to the broader aspects of immunity. The following subjects are discussed: the mechanism of capillary filtration; the capillaries in inflammation; the mechanism of increased capillary permeability. the migration of leukocytes into inflammed tissue; cellular sequence in inflammation; the phagocytic theory; the mechanism of leucocytosis with inflammation; inflammation in relation to immunity; localization of foreign materials in areas of inflammation; allergic and anaphylactic inflammation; the role of lymphatics in inflammation, and inflammation and bacterial invasiveness in relation to resistance.

This volume can be recommended as a modern presentation of the physiology of cellular irritability and the general biology of organic defense mechanisms.

MAN ALIVE YOU'RE HALF DEAD! A PHYSICIAN TELLS YOU HOW TO EAT YOUR WAY TO GLOWING HEALTH . . . AND STAY THERE. By Daniel Colin Munro, M.D., Medical Director of the Lake Placid Club, New York. Cloth. Price, $2.00. Pp. 209. New York: Dudley Courtenay, Publisher, 1940.

In simple interesting language this small volume presents many facts about diet. Most of the material is undisputed but there are many theories which are presented as proven facts. For instance, the chapter on "Don't Mix Foods That Fight" presents the improved diet fad of not mixing fats with starches, acids and carbohydrates, and high proteins with high starches. Other ideas also are overemphasized. Therefore, while it is interesting to read it is questionable whether or not it should be recommended to the public.

PSYCHIATRY FOR NURSES. By Louis J. Karnosh, B.S., Sc.D., M.D., Associate Clinical Professor of Nervous Diseases, School of Medicine, Western Reserve University, Cleveland, and Edith B. Gage, R.N., Supervisor, Neuropsychiatric Division, City Hospital, Cleveland. Cloth. Price, $2.75. Pp. 327, with 34 illustrations. St. Louis: C. V. Mosby Company, 1940.

The nursing care of mental patients admittedly is a difficult task. This is all the more so if the nurse has an inadequate understanding of the nature of the patient's illness. After all, the nurse has even more contact with the patient than does the psychiatrist. On the other hand, it is neither necessary nor desirable for the nurse to take upon herself a detailed study of the difficult study of psychiatry. The very sight of the usual large tome filled with descriptive psychiatry frequently is enough to frighten the nurse away from this subject. The present authors have appreciated this situation and have collected in a comparatively small volume the essentials of psychiatry which they feel every nurse should know. They have stressed the symptoms, terminology and treatment of the more common psychoses so that the nurse may recognize and understand the usual reactions of the mentally sick patient. The chapters are short and are made more understandable by numerous illustrations and case histories. A glossary has been included and has a definite value. This probably is the best book on this subject to date.

STATISTICAL METHODS FOR MEDICAL AND BIOLOGICAL STUDENTS. By Gunnar Dahlberg, M. D., LL. D., Professor at the University of Uppsala, Head of the Swedish State Institute for Human Genetics and Race Biology. Cloth. Price, $2.75. Pp. 232. New York: Interscience Publishers, Inc., 1940.

Karsner and Goldblatt in their article "Evaluation of Methods Used in Physical Therapy," published in the Handbook of Physical Therapy, direct attention to the statistical method in this evaluation. This volume by Dahlberg is an elementary introduction to statistical methods used to ascertain the significance of biological data.

As it demands very little mathematical equipment, it enables the research worker to dispense with the services of a statistician unfamiliar with the actual material to help him interpret his results. It can be recommended to research workers to enable them to understand the ways in which statisticians arrive at their results and to appreciate the significance which should be attached to these results.

THE 1940 YEAR BOOK OF INDUSTRIAL AND ORTHOPEDIC SURGERY. Edited by Charles F. Painter, M. D., Orthopedic Surgeon to the Massachusetts Women's Hospital and Beth Israel Hospital, Boston. Cloth. Price, $3.00. *Pp.* 484, *with 299 illustrations. Chicago: The Year Book Publishers, Inc.,* 1940.

This "year book" brings to the orthopedic and traumatic surgeon a fresh perspective of some of the articles he already has read plus many others which he is most unlikely to have covered in the course of his ordinary reading. It gives a digest of 276 papers and there are 299 beautifully reproduced illustrations. Bone and joint lesions, intervertebral disk lesions, congenital or hereditary conditions, traumatic and functional changes, fractures, tendons, paralytic and spastic conditions, foot and knee conditions, arthritis, industrial medicine and surgery are the subjects under which the articles are considered. Many references are made to the use of physical therapy in industrial and orthopedic surgery.

This volume can be recommended to industrial and orthopedic surgeons as giving a critically selective and condensed review of the outstanding recent contributions to their literature.

FRACTURES AND DISLOCATIONS FOR PRACTITIONERS. By Edwin O. Geckeler, M. D., Fellow of the American College of Surgeons, Fellow of the American Academy of Orthopedic Surgeons, etc. Second Edition. Cloth. Price, $4.00. *Pp.* 314, *with 267 illustrations. Baltimore: The Williams and Wilkins Company,* 1940.

Due to the increasing frequency and severity of automobile accidents, general practitioners and surgeons should be well informed as to the management of fractures and dislocations. The early care of these injuries often determines to a great extent the end result. It is of the utmost importance that the immediate treatment should be in accordance with accepted present day methods.

This book condenses the subject of fractures and dislocations without the omission of important details. Emphasis has been placed upon fundamentals and simplicity of treatment. The author believes that by understanding one reliable form of treatment for the average fracture, the practitioner will save valuable time in an emergency. Therefore, he has standardized the treatment as much as possible.

It is emphasized that although the practitioner should limit his fracture work to conservative treatment, skeletal traction is so important in fractures of the lower extremity that the physician should be equipped and be able without delay to insert a Steinmann pin or a Kirschner wire for this purpose. The author believes that the second exception to conservative treatment applies to compound fractures for which an immediate debribement operation is imperative.

This book gives special attention to careful follow-up treatment as being as important as the reduction of a fracture. There is a chapter on this subject, much of which is devoted to practical and occupational therapy. After each fracture and dislocation discussed there is a section on follow-up treatment, emphasizing the use of heat, massage and exercises.

This second edition of this simplified guide to the management of bone and joint injuries should be in the library of every general practitioner.

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